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Assessing the Effects of Advertising on Sales: A Study in Quick Service Restaurant Advertising and Consumption in the United States 1986—2007

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Assessing the Effects of Advertising on Sales: A Study in Quick Service Restaurant Advertising and Consumption in the United States 1986—2007

by

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Dedication

To my parents—

Thank you for giving me a broader canvas.

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Advertising is an important mechanism by which firms are able to communicate with their current and potential consumers. An advertising campaign may satisfy a multitude of objectives for a firm. Namely, advertising can be used to create awareness for a product or brand. It may be used to inform consumers about the usage features and benefits specific to a brand or a given product, or generate favorable attitudes and preferences amongst customers. Additionally, advertising may aim to persuade consumers towards trial or purchase. All these objectives enhance e consumers' response towards the firm and its products/brands, and in turn, advertising helps to achieve sales for the advertised firm in the long run.

This dissertation examined the relationship between advertising expenditures and sales revenue at the aggregate and brand level for the Quick Service Restaurant (QSR) industry in the United States from 1986 to 2007. Two main objectives of this study were to: 1) analyze the relationship between advertising expenditures and sales revenue within the QSR industry; and 2) provide analysis of the relationship between advertising and

sales revenues for leading QSR firms, in the United States during the observed period. Thus, the current study provides the most comprehensive analysis of the relationships between advertising and sales in the QSR industry to date.

Hypotheses were tested by time series analysis. Specifically, a stepwise regression analysis with backwards elimination of non-significant predicators was utilized to select a set of statistically significant predictor variables. This study controlled for factors expected to affect sales revenues such as population size, price and inflationary effects.

Findings from this study indicate that aggregate advertising expenditures and aggregate sales for the QSR industry in the United States were significantly and positively related from 1986 to 2007. This is the first study to examine this relationship over such an extended period of time—twenty-two years. Results from brand level show a positive and significant relationship between advertising expenditures and sales revenues for certain QSR brands. Additional analysis, explored the relationship between advertising expenditures and another measure of consumption, market share, for QSR firms in the United States during 1986 to 2007. Results from this set of analysis, demonstrated a positive and significant relationship between electronic advertising expenditures and market share for several QSR brands. A Chow test (Chow, 1960) was also conducted on the brand level models to test for the presence of structural breaks in the data. Other means of analysis are also offered, and the implications of the results to research and theory are drawn. The study also identified future directions for research.

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CHAPTER 1

INTRODUCTION

Introduction

What effect does advertising have on sales? This question has long captured the attention of advertising practitioners and scholars alike. Over the past three decades a voluminous body of research has emerged relating to various industries in the United States, United Kingdom and Europe. Research from different industries has provided important evidence to understand the relationship between advertising and sales, as well as the variables that are expected to affect the advertising-sales relationship.

The review of literature indicated that indeed for many industries advertising expenditures for a firm is associated with an increase in the level of sales for that firm. Past studies have examined the long-term effects of advertising on sales (Bass and Leone, 1983; Broadbent, 1984; Clarke 1976; Dhalla, 1978; Srinivasan and Weir, 1988). Generally, scholars maintain that advertising has a "lagged effects" on sales (Leone, 1995). That is, advertising does not produce an immediate effect on sales, rather it is a long term investment and the full benefits of advertising on stimulating sales are attained over time (Batra, et. al, 1995). In addition, research shows that the effect of advertising on sales tends to dissipate within three to fifteen months (Clarke, 1976). Further, some studies show that in particular electronic and print advertising expenditures may have a positive effect on sales (Abernathy and Teel, 1986; Wilcox, 2001). There is also evidence

in the empirical literature to support the contention that the effect of advertising on sales can vary by brand (Lodish et. al, 1995a).

Economic Analysis of Advertising—an Overview

One of the earliest analyses on advertising's effects in economics was done by Marshall (1809, 1919) who distinguishes between the 'combative' and 'constructive' roles that advertising can play within the economy. Under Marshall's view, when advertising has a 'combative' role advertising does not affect the primary demand for the advertising product or brand, rather it only impacts the selective demand for that product. That is, advertising may increase the demand for an advertised product, at the expense of the demand for a similar product. In contrast, when has a 'constructive' role, it creates demand for the advertised product, provides pertinent purchase related information to consumers such as price, product quality, usage and location.

However, Marshall did not formally incorporate the combative and constructive roles of advertising into economic theory. This was later done by Chamberlin (1933) who was the first scholar to integrate the role of advertising within his theory of monopolistic competition. The underlying assumption in Chamberlin's theory is that within a given industry, individual firms sell differentiated products. As a consequence, each firm is subject to a downward- sloped demand curve, meaning that as the price of a product decreases, the demand for that good will increase. Within this viewpoint, only few firms are able to possess monopoly over the market. In this theory Chamberlin identifies advertising as a means for firms to further distinguish their products from competing

firms. Thus, advertising allows firms to differentiate their products from rival companies and by doing so aids the advertised firm to expand its market. So, when a firm increases its advertising expenditures it balances the costs incurred by market expansion i.e. increase in its sales. It is important to note that this theory does not take into account varying responses from the consumer; Chamberlin assumes that consumers will be responsive to the advertising efforts of a given firm. Instead, the author provides two possible explanations for consumer responsiveness to advertising efforts. First, advertising imparts important consumption related information to the consumer such as the existence of products price and quality information. The second reason, alludes to the persuasive properties of advertising, the author argues that advertising affects the wants or tastes of the consumers (Chamberlin, 1933, p.118-120).

These two roles of advertising provide different effects on demand. If advertising provides price and quality related information that the demand curve of the advertised firm will be more elastic as consumers become more aware of the quality and price points in the market. But, if advertising alters the preferences or tastes of the consumers through advertising, then the advertised firm's demand curve shifts outwards, increasing its market share, but this curve is more inelastic as consumers are less likely to shift to other competing products. Thus, Chamberlin identifies the informative and persuasive roles of advertising. Additionally, Chamberlain's early work also discusses the use of increased message repetition and effective media selection to increase consumer responsiveness to advertising. Simultaneously, he states that in the long run advertising will have

diminishing returns to sales as additional increments in advertising expenditures become less efficient in attracting additional consumers.

These early works mark the beginnings of the economic analysis of advertising. In a seminal study on the economic effects of advertising was executed by Borden (1942a; 1942b). On the basis of an extensive intra-industry study Borden notes that that the effect of advertising on the demand for a product can vary by the nature of the market and the maturity of the product advertised, advertising may produce different effects. In particular, he states that in a market that is, advertising will have a positive effect on the demand at the aggregate level. That is, advertising will have a positive effect for the category of firms within that market. However, in mature or declining markets, advertising is less likely to have an effect at the aggregate level. Instead, advertising will impact the selective demand in this market. Thus, advertising for a given firm is likely to have an effect on the sales for that firm, but this is at the expense of rival firm's market share. In addition, Borden argues that in new industries advertising will have the "greatest influence" to increase demand (Borden, 1942b, p. 97).

Many scholars assert that advertising is "combative" in nature. That is, advertising reallocates the market share of firms in a given industry and does not increase the overall demand (see Lambin, 1976; Metwally, 1975, 1976; Alemson, 1970; Thomas, 1999). On the other hand, in growing industries Borden (1942) contends that advertising can serve to expand the entire market. A majority of studies examining advertising-sales relationships have often focused on declining or mature industries such as tobacco

(Grabowski, 1976; Schneider et. al, 1981; Yuclet and Kaynak, 1984; Baltagi and Levin, 1986; Johnson, 1986; Godfrey, 1986; Hoffman, 1987; McAuliffe, 1988; Baltagi and Levin, 1992; Wilcox and Vacker, 1992; Duffy, 1991; Franke, 1994; Wilcox et. al, 1994; Duffy,1995; Goel and Morey, 1995; Duffy, 1996; Gallet, 1999; Duffy, 2003),alcohol products(Johnson and Oksanen, 1974;Prest,1949; Walsh, 1982; McGuinness,1980; Franke and Wilcox, 1987; Duffy, 1990, 1993; and Selvanathan, 1991;Nelson and Moran,1995;Fisher and Cook, 1995;Wilcox, 2001) ;Wilcox et. al, 2006; Bourgeois and Barnes, 1979) and automobiles (Cowling and Cubbin, 1971; Kwoka, 1993; Peles, 1971; Geroski and Murfin, 1991; Greuger et. al, 2000; Geroski and Mazzucato, 2000). There is still a lack of such research in food related industries, where the push for communications policy makes the need to for such studies more critical (Duffy, 1999).

A number of study spanning various industries suggest that aggregate advertising expenditures has a positive impact on aggregate level consumption such as sales and/or market share. For example, in studying the effect of aggregate advertising expenditures and consumption of beer, wine and distilled spirits Walsh (1982) reported a positive and significant relationship between advertising and sales. In another study based in the United Kingdom Mc Guinness and Cowling (1975) found that advertising had a positive effect on sales for aggregate beer from 1957 to 1968. A later study by Duffy (1993) finds similar results; the authors note a positive effect of total beer advertising on aggregate beer consumption in the United Kingdom. Borden (1942) examined the effect of advertising on the primary and the selective demand for cigarettes in the United States from the late 1800s to the late 1930s. Findings from this study show that advertising is an

important factor in increasing primary demand for cigarettes. Similarly, Leeflang and Revijl (1985*)* analyzed the effect of cigarette advertising and the primary demand for cigarettes in West Germany. Findings from this study show that print advertising had a statistically significant relationship with aggregate consumption of cigarettes. More recently, Yiannaka et. al (2002) examined the effect of advertising on sales for 34 meat processing firms in Greece over a 14 year period, from 1983 to 1997. Results from this study show that advertising has a positive effect on the sales of meat during the observed period. In another study, Duffy (1999) notes that advertising for meat and bacon products have a positive effect on sales for these products in the United Kingdom from 1969 to 1996. Also, the authors find that advertising has a positive impact on the consumption of coffee, tea and cocoa items during the same timeframe.

Past research has also found that brand level advertising has a positive and significant relationship with brand level consumption variables (such as sales and/or market share). For example, Wilcox (1991) investigated the effect of brand advertising expenditures and consumption of ten brands of cigarettes in the United States from 1949 to 1985. Findings from this study show that brand advertising expenditures had a positive relationship with brand consumption for five brands of cigarettes. In an earlier study Nguyen (1987) investigated the effect of advertising expenditures by four tobacco companies using data from 1956 to 1979 for twelve brands. Results suggest that advertising had a positive effect on brand sales from 1956 to 1979. Similar results are found by Pollay et. al (1996) who report a positive effect of brand advertising on sales to

adults and adolescent consumers for nine U.S. brands of cigarettes from 1974 to 1993. In a study about aggregate beer advertising expenditures and beer consumption in the United States over twenty two years, Wilcox (2001) found significant positive relationship between brand advertising and consumption for leading U.S. beer brands. Other studies such as Cowling and Cubbin (1971) and Kwoka (1993) report a significant and positive relationship between brand automobile advertising and sales. Additionally, Peles (1971) found that current brand advertising may have a positive effect on future sales for automobiles.

Research Objectives of the Current Study

Currently, the focus of researchers has shifted towards the relationship between food advertising and consumption. However, there are a limited number of studies that examine the effect of advertising in growing food markets (Luik, 1996; Duffy, 1999). Bearing, this in mind the current study investigated the advertising-sales relationship in the Quick Service Restaurant (QSR) industry in the United States from 1986 to 2007.

Fast food is a major business sector in the United States economy. Current forecasts approximate that this sector will reach a value of approximately $66.2 billion by 2011 (Datamonitor, 2009). Since 2006, the industry will increase by roughly 20 percent by 2011. From the standpoint of international economics, the fast food sector in the United States represents over 53.8 percent of the global fast food market's value (Datamonitor, 2009). Thus, the fast food industry in the United States is a prominent feature of national and international economy.

The predominant segment within the fast food industry is the Quick Service Restaurants (QSR) segment, which corresponds to over 73 percent of the entire fast food industry in the United States. In terms of national aggregate restaurant sales QSR firms accounted for over 41 percent in 2007. Scholars note that even in recessionary times, the sales of fast food franchises grew as high as 11 percent (Kara et. al, 1997). Certainly, the QSR market is a lucrative and important market for the national economy, it is also a growing market with aggregate sales estimated at $59.7 billion dollars in 2008 (Datamonitor, 2009).

In terms of the advertising industry, the QSR market represents an important business sector. Due to the high levels of competition in the QSR market, firms often engage heavily in advertising and branding activities (Hoovers, 2009). Thus, QSR firms represent heavy users of advertising users and represent an important business segment for advertising firms and practitioners. It is approximated that the QSR industry alone spends over $4 billion annually in advertising expenses (Schlosser, 2006). In addition, QSR firms typically invest large shares of their advertising budgets towards electronic media, specifically varying formats of television (Gallo, 1999). Current brand evaluation reports suggest that many QSR rank among the most powerful brands in terms of their global brand equity and brand value (Millward Brown, 2008). This further underscores the importance of branding and advertising within this market segment.

The objective of this study is to provide a comprehensive analysis on the relationship between advertising and sales revenue for the QSR industry, over a 22 year period in the United States. With these goals in mind, three research questions were

established: 1) How does aggregate advertising expenditures effect aggregate sales in the QSR Industry from 1986 to 2007?; 2) How does aggregate advertising expenditures by each media (electronic, print and outdoor) effect sales in the QSR Industry from 1986 to 2007?; and 3) How does advertising by each media (electronic, print and outdoor) effect sales of each QSR firm from 1986 to 2007?.

To address the aforementioned research questions, three hypotheses were proposed. The three research hypotheses were divided into two sets: 1) "aggregate", which pertains to the QSR industry level advertising and sales data and 2) "brand", which deals with the individual QSR firms level advertising and sales data. The two research hypotheses for the aggregate level data predict: (1) the positive relationship between aggregate advertising expenditures and aggregate sales revenues; (2) the positive relationship between aggregate advertising expenditures by media type (electronic, print and outdoor) on aggregate sales revenues. Similarly, the brand level hypotheses predict: (1) the positive relationship between brand advertising expenditures by media type (electronic, print and outdoor) on brand sales revenues.

The hypotheses were tested using a stepwise regression analysis with backwards elimination of non-significant predicators (following Wilcox, 2001; Wilcox, 2006). In analyzing the relationship between advertising expenditures and QSR aggregate and brand sales revenues, this study controlled for factors expected to affect sales revenues such as population size, price and inflationary effects. Regression analysis was conducted for aggregate and brand level data.

Research Implications of the Current Study

The QSR market is one of great importance in terms annual sales, expenditures in advertising and brand value on a national and international level. Despite the size and importance of the QSR market and its relevance to advertising, no study has examined the relationship between advertising expenditures and sales revenues within the QSR market. The current study examines the longitudinal relationship of industry and brand level advertising expenditures a sales revenues over a 22 year period within a leading and heavily advertised industry in the United States, namely, quick service restaurant (QSR).

The sample of QSR companies selected for inclusion in the current study was made based upon three criteria. First, the company must be present under the North American Industry Classification System (NAICS) code as a "Limited Service Restaurant". Second, the company must be ranked among the QSR Magazine Top 50. Third, the financial and advertising expenditure for the QSR firm must be continuously available for the observed period (1986 to 2007). Based on the abovementioned criteria a total of nine QSR firms were selected. The sample of QSR firms consisted of: McDonald's, Wendy's, Sonic, Jack-in-the-Box, PizzaHut, Domino's, Subway, KFC and TacoBell. These firms rank among the top 15 brands of overall QSR sales for 2007. The total sales of the sample of firms used in this study represents ninety-four percent of total QSR sales in 2007 in the U.S. In addition, the collective sales of these nine firms account for approximately seventy percent of sales in the entire fast food market (including aggregate US sales from Quick Service Restaurants, Takeaways, Leisure Locations and

Mobile & Street Vendors) in 2007. These calculations were based on the Datamonitor 2008 U.S. Fast-Food Industry Report.

Research outcomes of the current study are likely to impact practice, research and policy development. In terms of research literature, the results of this study will contribute to research on the sales effects of advertising (Borden, 1942; 1944; Telser, 1962; Assmus et. al, 1984; Leone and Shultz, 1990; McDonald, 1992; Lodish et. al, 1995; Parker and Gartignon, 1996; Wilcox, 1994, 2001), by providing further insight into the relationship between advertising and sales in a important and heavily advertised industry, not previously studied. Past research has focused on declining or mature markets, the current study will extend the literature by studying the advertising-sales relationship in an expanding or growing market. Secondly, results regarding the relationship between advertising expenditures and sales in a heavily advertised industry can aid advertising practitioners to assess advertising expenditures and budget allocations. Third, from a policy perspective the current study also offers important implications. With growing public concern focused towards the rise in obesity in the United States, QSR companies have received growing criticism in the past decade. Popular media such as Eric Schlosser's bestselling book, "Fast Food Nation" published in 2001 and well-received documentary "Supersize Me" has generated heated criticism towards QSR companies among the general public. This study will contribute to the understanding of the relationship between advertising expenditures and sales revenues in the QSR market in a quantitative way, thereby providing insight to communication policy makers.

Organization and Description of Dissertation Chapters

The organization and description of chapters in this dissertation are as follows. In Chapter 2: Literature Review, previous research on the relationship between advertising and sales is provided in detail. The chapter first examined the history of econometric analysis of advertising. This section of the literature review focuses on the emergence of advertising as a topic of discussion in economics. Pioneering studies that investigate the phenomena of advertising in economics, namely Marshall (1890, 1919) and Chamberlin (1933) are brought to light. In particular the distinction between the two roles that advertising is theorized to play in the economy, namely the "constructive" and "combative" roles of advertising, are explained. The empirical evidence from previous studies is reviewed at length. Several key issues that arose from previous empirical investigation are mentioned, namely: the goodwill effect of advertising, carry over effects of advertising and data interval issues in carry over effect estimation. The results from past studies are organized and presented by industry. Previous research has clustered around a handful of industries namely the alcohol, cigarette and automobile industries. Only a few studies have examined food and food related industries, these studies are also presented in the chapter. The lack of research on advertising sales effects outside these industries is noted, particularly in the Quick Service Restaurant (QSR) industry. Findings from other industries are discussed as a segue to studying a prominent and heavily advertised industry in the United States, the Quick Service Industry (QSR), which is the focus of the current study .

On the basis of the review of literature Chapter 3: Research Hypotheses, presents the research hypotheses of the study. In particular, three research questions are posed: 1) How does aggregate advertising expenditures effect aggregate sales in the QSR Industry from 1986 to 2007?; 2) How does aggregate advertising expenditures by each media (electronic, print and outdoor) effect sales in the QSR Industry from 1986 to 2007?; and 3) How does advertising by each media (electronic, print and outdoor) effect sales of each QSR firm from 1986 to 2007?. To answer the central research questions, the current study puts forth three hypotheses (and six sub-hypotheses) to be tested.

Subsequently, Chapter 4: Methodology delineates the methodology used to test the research hypotheses of the present study. Included in this chapter is a description of the data analysis procedure to be followed in analyzing the results. In addition, the independent and dependent variables of this study are discussed in detail. A model-building approach is used in determining the significant subset of predicator variables for sales revenue at the aggregate and brand level for the QSR market in the United States from 1986 to 2007. Regression analysis is proposed as the method of analysis, in order to reach the final subset of predictor variables. Factors endogenous to marketing that are expected to affect sales revenues such as population size, price and inflationary effects are also discussed, and means for controlling these variables are also discussed.

The results of the hypotheses testing are presented in following chapter, Chapter 5: Results. At the beginning of the chapter few descriptive tests are preformed and discussed, prior to the hypotheses testing. Following this, the results of regression

analysis, corresponding to each research hypothesis are provided. In addition to the aforementioned analysis, this study also conducted several additional analyses on the data. Specifically, regression analysis (using an alternative consumption variable), Chow test, and persistence modeling, were also preformed on the data. The results from these tests are also provided.

In the end, Chapter 6: Conclusions, Implications and Future Research present the findings of this study and its implications to theory and practice. The chapter concludes with a discussion of the limitations in the present study as well as directions for further study.

Summary

This chapter presented a historical overview of the economic analysis of advertising. There is a need for empirical research analyzing the effect of advertising in growing food markets (Luik, 1996; Duffy, 1999). Bearing this in mind, the current study examined the relationship between advertising expenditures and sales in a prominent food industry in the United States, the Quick Service Restaurant (QSR) industry, over a twenty-two year period from 1986 to 2007. The study objectives and implications to theory and practice were also discussed in this chapter. In addition, the organization and description of each chapter is provided. In the following chapter, a detailed discussion of the research literature is presented.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter provides a review of the literature on the relationship between advertising and sales. The review of literature begins with an examination of the history of research on econometric analysis applied to advertising. Next, research literature examining the effects of advertising on consumption is discussed at length. In particular, this section focuses on academic studies on the relationship between advertising and market performance, measured by sales revenues and/or marketshare. The bulk of research within this stream revolves around a few of industries, namely the alcohol, cigarette and automobile industries. To date there is a lack of research on advertising sales effects outside of these industries, particularly in the Quick Service Restaurant (QSR) industry. Only a handful of studies have examined food and food related product industries. Since there is limited research on food industries and no previous research has examined the QSR industry, the current study draws upon past research across various industries to build a framework to study the QSR industry. This chapter will provide a comprehensive review of these studies. In an effort to build an important segue to studying a prominent and heavily advertised industry in the United States, the Quick Service Industry (QSR), which is the main focus of this dissertation.

The last section of the literature review provides information on the QSR industry, market structure, leading firms, and other pertinent information. This chapter concludes with summative remarks as well as a brief introduction to the following chapter, Chapter 3: Research Hypotheses.

Economic Views on Advertising: A Historical Background

It is hard to imagine modern life without the presence of advertising. Consumers receive and engage in advertising messages on a daily and frequent basis via television, radio, news papers, magazines, billboards, and the internet. Indeed, advertising is a vibrant part of the national economy. Since the turn of the century advertising has been an area of much discussion. In particular, advertising's role and effects have been examined through the lens and perspective of many domains including history, economics, management, and psychology (Packard, 1957; Borden, 1942; 1944; Holt, 2002; Levy, 1963; McCracken, 1988; Lears, 1994; Jhally, 1987; Batra, Meyers and Aaker, 1995). These varying and often contradictory approaches envision the role of advertising as dialectical and symbolic to wasteful and damaging. Similarly, advertising effects has been a burning issue in advertising research and management, evoking many heated debates and discussions. While advertising primarily plays an economic role, it also impacts society in social and psychological ways, thus making it hard to measure all of its effects in a quantitative and definitive way.

It was not until the late 19th century that advertising emerged as a topic for economic thought and discussion. Several factors can be attributed to this—first; under

the classical assumptions of economic theory consumers were assumed to have preset preferences for products and perfect information (Bagwell, 2005). Under these two assumptions, it was understood that a firm's advertising efforts would not produce any effect on consumers who already had knowledge of the products or services they required as well as a fixed set of preferences on which their selection and purchasing behavior has based upon. More importantly, major brand advertising did not come into existence until the early 20th century (Bagwell, 2001). It was the advent of modern communication technologies as well as enhancements in transportation systems that spurred the use of large scale brand advertising. In fact, due to the rapid advancements and cost reduction in communication and transportation technologies it became possible for manufacturers to mass produce their goods and avail the benefits of economies of scale whilst driving their brand's demand of their particular product through brand advertising. In this way manufacturers could cheaply transport their goods wherever there was ready demand. This marked the beginning of large scale advertising designed to stimulate the demand for brands. The emergence of large scale brand advertising is also described in more detail by Borden (1942), Chandler (1990) and Pope (1983). Thus, at the beginning of the early 20th century advertising became a stimulating and emergent topic for economic research.

The economic analysis of advertising can be traced back to Marshall (1890, 1919) and Chamberlin (1933).These authors were the first to integrate the selling cost of goods into economic theory. One of the earliest economic analyses of advertising was conducted by Marshall (1890; 1919). The author established a distinction between the

two specific roles that advertising can play within the economy. First, he stated that advertising can have a 'constructive' role in the economy. Within this perspective advertising is envisioned as a means to provide consumers with information. By imparting pertinent information to the consumer, advertising increases the consumers' knowledge and reduces their search costs. Also, Marshall also proposed an alternative view—advertising may have a 'combative' role on the marketplace. In this viewpoint advertising is perceived to provide little new information to consumers and mainly redistributes consumers from one firm to another. It is important to note that, while these early works by Marshall did not provide a formal integration of advertising into microeconomic theory, his work provided an important foundation for the later development of a conceptual framework describing the economic role of advertising.

Subsequently, in 1933 Chamberlin's early work on the theory of monopolistic competition, established a model in which a firm's advertising expenditures are integrated into the "selling cost" of a good. In his proposed model the selling cost of the good is theorized to shift the downward-sloping demand curve out for a given firm's differentiated (advertised) product. Chamberlin (1933) not only acknowledged the informative and persuasive aspects of advertising, because advertising may impart information on consumers, but that advertising can also have a persuasive role on the consumer's demand preferences. The author hypothesizes that advertising indeed performs both. In Chamberlin's theory, when advertising is informative, the elasticity of demand for a product is enhanced. As a result, informative advertising can aid consumers in selecting a product that satisfies their consumption needs while responding

to price differences. Alternatively, Chamberlin posited that when advertising plays a persuasive role, it impacts the preferences of the consumer and thereby reduces the elasticity of demand for a product. The author underscored the importance of economies of scale, arguing that economies of scale exist in both the production of goods as well as in advertising.

Empirical Findings: The Effects of Advertising on Consumption

In examining the empirical studies on advertising and sales two important questions arise. The first question is: does current advertising have a positive and significant association with current and future sales? Support for such an association would provide empirical evidence on an advertising "goodwill" effect, and would provide support for early works in this area such as Braithwaite (1928) who contended that advertising produces long run reputational effects. The second question at hand is: does advertising increase the aggregate demand for a given product? Or does advertising impact selective demand by redistributing the sales within the industry? Evidence for the latter would support the argument of Marshall (1890) who states that advertising tends to rearrange sales among industry players.

At the beginning of the 1970s, many statistical studies existed the examined advertising with sales or market shares and other variables. However, many of these studies have limitations due to the failure to include a lagged measure permitting the

identification of a good will effect and measures to assess the effect of rival firm advertising on a firm's own sales (Schmalensee, 1972).

Advertising-sales research literature was greatly advanced by Lambin (1976) who conducted a study examining sales, quality, price and advertising data for 107 brands among sixteen product classes. The data was collected from eight different Western European countries over a ten year period from 1960 till 1970. Results from the study showed that advertising had a positive and significant effect on the brand's sales and market share. Furthermore, Lambin reported the existence of a "goodwill" effect of advertising. However, the quantitative impact of price and product quality variables on current and future sales appeared to be more than advertising on sales. The author further noted that rival advertising was negatively related to a firm's sales and market share. Lambin suggests that the competing impact of rival advertising and own advertising on sales tended to cancel each other out. Overall, Lambin offered limited support for the view that advertising increased overall industry demand. In fact, findings from this study provided support for the combative role of advertising.

A number of studies further examined the goodwill effect of advertising. A group of studies test the distributed-lag relationship between current advertising expenditures and sales, estimating the rate at which advertising effects diminish over time. Several early studies in this category of empirical work provide influential results. For example, Palda, 1964, 1966; Peles (1971), and Telser (1962) argued that advertising goodwill effects may be substantial in nature. That is, the cumulative effects of advertising create a

sense of goodwill among consumers, who will possess more favorable attitudes towards the advertised brand. For numerous industries, results from this group of studies show that firm-level depreciation rates vary from 15 to 50 percent per year. Similarly, Brown (1978) in a study about cigarette advertising and sales, reported that brand-level depreciation rates were close to 60 percent.

In an initial study, Hollander (1949) presented results that demonstrated carry-over effects of advertising. Numerous studies preceding Hollander also showed evidence of a lagged effect of advertising (Jastram, 1955; Vidale and Wolfe, 1957; Nerlove and Waugh, 1961). Within this body of research, perhaps one of the most notable and comprehensives studies include Palda (1964, 1965). Palda (1965) underscored the absence of empirical research on the cumulative effects of advertising expenditures on sales. The author followed Stigler's (1961) definition of cumulative effects of advertising indicating that "the effects of advertising persist beyond the period of expenditure and become a valuable if intangible asset of the company" (Palda, 1966, p. 162). In fact, the author pointed out only four studies within this domain: Hollander (1949), Nerlove and Waugh (1961), Tull (1956) and Vidale and Wolfe (1957). The goal in this study was to determine whether cumulative advertising effects on sales can be measured with improved precision. The author put forth a very detailed analysis of advertising-sales relationship utilizing several models employing multivariate regression techniques. Results from this study showed that advertising serves as an intangible asset by providing sales effects, and that on average 95 percent of the advertising expenditures are amortized

within a period of aproximately seven years. Another set of studies found similar results indicating that advertising indeed has a positive influence on sales (Lambin, 1969, 1970, 1976; Peles, 1970, 1971; Simon, 1969, and Tull, 1965).

In an extensive review of the econometric literature on the duration of advertising effects on sales, Clarke (1976) explored the issue of a "data-interval-bias" problem. Clarke not only reviewed the econometric studies on advertising sales effect but also classified nearly 69 studies into groups based on the data collection interval used. On the basis of his exhaustive and thorough review the author contended that the use of annual advertising data, when advertising effects tend to diminish over shorter periods of time, may result in biased estimates of the advertising depreciation rates. Clarke offered several important substantive findings regarding the duration of effects on the basis of the collective findings of empirical studies. He noted that individually each of these papers provided only a portion of the answer, and insisted that a satisfactory answer can only be understood when the empirical research findings are considered collectively. In sum, the author indicated that the effect of advertising on sales is likely to last several months to a year. Specifically, Clarke (1976) stated: "the duration of cumulative advertising effect on sales is between 3 and 15 months; thus this effect is short term (about a year or less) phenomenon" (p. 355). Further, the author asserted that there is a need for empirical research on "a broader range of products" (Clarke, 1976, p. 355), since nearly 70 percent of all products studied are in the mature market stage.

Numerous studies examined the long-term or "carry over" effects of advertising (Bass and Leone, 1983; Broadbent, 1984; Clarke 1976; Dhalla, 1978; Srinivasan and Weir, 1988). Taken collectively, the results of these studies suggest that the duration of the effect of advertising is incumbent on the data interval. That is, the interval at which advertising is measured such as bi-month, monthly or weekly, impacts sales differently. In an extensive meta-analysis of the econometric advertising literature, Clarke (1976) found that 90 percent of advertising effects dissipate within three to fifteen months. Similar findings were found in another meta-analytic study conducted by Assmus, Farley and Lehmann (1984). In another study, Winer (1980) found that advertising effects are temporary and do not produce a lasting effect on consumption. Others, such as Leone (1995), claim that the advertising effects range should be limited to six to nine months. Lodish et. al (1995a), conducted a single source study to examine the effects of advertising on sales of advertised brands. Findings from this study suggested that advertising was positively correlated to sales in 33 percent of the cases within the study and 55 percent for new brands. The author noted that advertising-sales effects can vary depending on brands. Another study by Dekimpe and Hanssens (1995) found that advertising effects "do not dissipate within a year" (p. 18). While in some cases the role of advertising may be to produce short run sales (for example retail announcement ads), numerous scholars contend that advertising produces "lagged effects" in terms of sales (Leone, 1995). These studies suggest that advertising does not produce an immediate effect on sales, but rather advertising is a long term investment and thus, its full benefits are procured in the long run (Batra, et. al, 1995).

Clarke's study stirred up a dynamic debate among scholars and researchers in marketing and advertising, many authors responded to Clarke by putting forward arguments supporting and/or disputing the conclusions of the survey (Peles, 1979; Weiss and Windal, 1980; Weinberg and Weiss, 1982). For example, Dekimpe and Hanssen (1995), reported evidence to dispute Clarke's (1976) conclusion that nearly 90 percent of the measureable sales effects of advertising dissipate within a few months. Results from their study showed that in evolving markets the effects of advertising on sales may follow Clarke's conjecture in stable environments but this generalization does not hold true in evolving markets. Specifically, the authors contended that: "if the distinct nature of evolving environments is not taken into account, one may seriously underestimate the long-run effectiveness of advertising' (Dekimpe and Hanssen, 1995, p.18). In fact several empirical studies including: Lambin (1970), Nerlove and Waugh (1961), Palda (1964), Peles (1971), and Telser (1962) demonstrated the long-lasting effect of advertising on sales.

Subsequent studies such as Ashely et. al (1980), Boyd and Seldon (1990), Sheldon and Doroodian (1989), and Leone (1995) provided further evidence in support of these findings that advertising effects on sales largely dissipate in a year. In particular, Leone (1995) provided theoretical justification and empirical support for the data-interval bias, indicating that advertising effects on sales depreciate within the range of six to nine months.

Firm relevant factors are also important whilst considering the cumulative or goodwill effect of advertising (Bagwell, 2005). Nelson (1974b) provided theoretical evidence for this suggesting that while advertising impacts the initial sale of a given product it is firm specific factors such as product quality that sustain long-term sales. The author goes on to say that higher quality firms may be inclined to advertise more, in an effort to inform consumers about the features and superiority of their products over the competition. Because of this, studies that do not include a measure for product quality may be overstating the effects of advertising on future sales. Landes and Rosenfield (1994) provided empirical evidence for this, using COMPUSTAT data for 417 firms over a four year period from 1982 to 1986. Results showed that the absence of firm-specific dummy variables (used in proxy for firm related factors such as product quality, etc.) the durability of advertising is overstated. Thomas (1989) also underscored the importance of brand specific factors in the study of advertising depreciation rates. In this study the author included brand loyalty specification and reported depreciation rates of nearly 80 percent for cigarettes and soft drinks. Similarly, Kwoka (1993) examined the determinants of sales in the automobile industry in the United States. The author found evidence to support the notion that advertising produces short-run effects on sales.

A second set of studies within the econometric analysis of advertising examined the effect of advertising on industry versus firm or brand level. Perhaps one of the most pivotal studies in this vein is Borden (1942) who delineated the relationship between the two types of demand that advertising can impact. Specifically, the author distinguished

between advertising effects on selective demand and primary demand. Selective demand is when advertising is expected to affect the demand of products at the firm or brand level; while primary demand is when advertising impacts the demand for the overall industry. Results from Borden's study shows evidence for the combative view of advertising. There is a strong effect on the selective demand among several major U.S. industries. The author argued that social and environmental factors are the major driver for primary demand; bearing this in mind advertising is likely to only reinforce these macro level trends.

Bradford (1960) used data for major appliances manufactured by General Electric Company including home, traffic, and industrial components. Study results showed that advertising played a role in impacting sales and market share for some components but not for others. This provided evidence that advertising effects on sales may depend on the product category under investigation. Similarly, in an experiment using data from Ford, Brown (1961) examined the effect of all 16 possible media combinations of four media (television, radio, newspaper and outdoor) on sales before and after advertisement placement. Findings from this study showed that advertising has a significant relationship with sales for Ford. Additionally, the author contended that there is no superiority or inferiority in terms of media used.

Metwally (1975, 1976) explored the combative nature of advertising among top Australian brands. Results indicated that the elasticity of advertising reaction over time remained positive. The author noted that there is a cancellation effect. Similar to Lambin

(1976), results from this study showed that advertising often faces reciprocal cancellation over time.

Similarly, in a study on the Australian cigarette industry, Alemson (1970) noted that a presence of a reciprocal cancellation effect, that is new firms that enter the market advertise to increase or gain market share, at the same time firms presently operating in those markets increase their advertising expenditures to maintain their market share. More recently, Thomas (1999) examined the ready-to-eat cereal market stating that firms in the market often use advertising as a means to limit sales of new firms entering the market. Cubbin and Domberger (1988) studied 42 consumer goods industries and found that dominating firms that operate in slow growing markets use increased advertising as a response to new market entrants in the hopes that the increase in advertising will limit the sales captured by the new firm entering the market.

Another set of studies within this literature focused on the industry level aggregate sales and the effect of industry- wide advertising efforts. Results from this group of studies presented conflicting results. In many cases advertising positively impacted industry level sales. For example, in a study about the cigarette industry in the United Kingdom, Cowling, Cable, Kelly, and McGuinness (1975) found that sales was positively affected by advertising. In another study about the car market in the United Kingdom, Cowling and Cubbin (1971) also reported a significant impact of advertising on sales. Similarly, in studying the orange market in the United States, Sheldon and Doroodian (1989) find similar results. Kowka (1993) investigated the effects of style

change and advertising in the automobile industry in the United States. Results from this study indicated that advertising has a positive and significant effect on sales for U.S. car companies.

On the other hand, there is empirical evidence that suggest for certain product categories, advertising does not have a significant positive impact on sales. For example, in the cigarette market in the United States, Baltagi and Levin (1986), Hamilton (1977), and Schmalensee (1972) all found no significant effect of advertising on sales. More recently, Nelson (2004) and Tremblay and Tremblay (2005) for the beer market in the United States reported no significant effect of advertising on sales. On the whole, taking these results collectively one can conclude that advertising may impact the primary demand for goods in some industries.

Summary of Empirical Findings: The Effects of Advertising on Consumption

In sum, three main conclusions can be inferred from the aforementioned literature. First, current advertising expenditures for a firm are associated with an increase in the level of sales for that firm. Findings from the empirical research show this positive association consistently, but with one caveat—this effect is typically short lived. Further, there appears to be a positive effect of electronic advertising and print advertising on sales. Second, findings from the studies discussed above show that advertising tends to be "combative" in its nature. That is, advertising can increase sales of a given firm, but it is usually at the expense of sales of rival firms. When this occurs, usually the rival firms

will increase their advertising levels in response and the cycle continues. Lastly, the effect of advertising on primary demand is not consistent across various industries.

Key Findings from Studies Targeting Specific Industries

In the following section key findings from the research literature on the advertising and sales relationship are discussed. Because no previous research has examined the QSR industry, this section of the review of literature draws upon the findings from industries examined by past studies. The discussion of the findings from these industries builds a foundation to study the QSR industry. Specifically, in this section, the results from the empirical literature are presented by industry, namely: 1) Tobacco, 2) Alcohol, 3) Automobile, 4) Miscellaneous, and 5) Food and Food Related Products.

Tobacco Industry

Unlike the QSR industry, there is a rich body of research that analyzed the effect of tobacco advertising expenditures on consumption. In a classic study Borden (1942) examined advertising expenditures from the late 1800s to the late 1930s to see the effect of advertising expenditures on the primary and the selective demand for cigarettes. The author noted that advertising is an important factor in increasing primary demand for cigarettes. However, the author underscored that the increases should not entirely be attributed to advertising expenditures alone. There are endogenous factors that can impact the primary demand. Borden stated that even though advertising plays an important role

in determining the overall consumer demand, there are other factors such as product quality, flavor and price that play into consumer's brand choice.

Telser (1962) conducted a study using a pre and post war comparison of annual advertising expenditures and cigarette sales as well as industry competition. The author concluded that in both pre-war and post-war time periods substantial competition was present among the firms in terms of the advertising expenditure levels. Hamilton (1972) used yearly data from 1925 to 1970 and found that the demand for cigarettes was only minimally related to advertising. Schmalensee (1972) looked at yearly advertising expenditures and cigarette sales from 1955 to 1967. In contrast to the findings of the aforementioned studies, Schmalensee finds that industry level advertising has no significant affect on industry or primary demand or on the individual firm's sales. In contrast, both Hamilton (1972) and Abernethy and Teel (1986) noted a positive relationship between advertising expenditures and aggregate demand, although the effect sizes for the advertising variables were small, thus collectively the results from these two studies implies that advertising has an influence on aggregate demand, although this effect may be minimal.

Examining the relationship between advertising expenditures and sales in the United Kingdom, Mc Guinness and Cowling (1975) found that advertising had a statistically significant and positive effect on aggregate consumption of cigarettes from 1957 to 1968. Similarly, Leeflang and Revijl (1985*)* examined the relationship between cigarette advertising and primary demand for cigarettes in West Germany. The authors employed several models using annual, monthly and bi-monthly data from 1960 to 1975.

Findings from this study suggested that advertising had a positive and significant effect on the primary demand for cigarettes in West Germany, however the authors caution that these effects diminish over time.

Abernethy and Teel (1986) examined data from 1949 to 1981 and found that only print advertising had a statistically significant relationship with aggregate consumption of cigarettes. However, the authors noted that this relationship was small in magnitude. The authors went on to conclude that cigarette advertising primarily impacts the individual firm's market share. Johnson (1986) conducted a similar study in Australia; results from this study showed a negative but insignificant relationship between advertising and primary demand for cigarettes. In a subsequent study, Johnson (1988) concluded that aggregate advertising expenditure did not show a significant relationship with the consumption of cigarettes in Australia. In a study based in the United States, Franke (1994) draws similar conclusions stating that advertising does not have a significant relationship with aggregate consumption of cigarettes.

Bearing in mind the empirical evidence evaluating the impact of tobacco advertising, Watterson (1990) provided a summary of the role of tobacco advertising in the context of advertising and market competition. The author stated that tobacco advertising was best understood in the market context of brand preference advertising among rival product advertising. This contention was supported by Wilcox (1991). In a study about cigarette brand advertising and consumption in the United States from 1949 to 1985, Wilcox (1991) examined brand advertising and consumption of ten major U.S. brand of cigarettes. Wilcox found that brand advertising expenditures had a positive

relationship with brand consumption for five brands of cigarettes. Further, the author stated that all of these brands had exhibited strong market growth in the observed period under study. The author further stated that advertising is, "a fairly important marketing tool and that when used effectively it may influence brand consumption" (Wilcox, 1991, p. 65). These results are consistent with other studies. For example, Nguyen (1987) examined the effect of advertising expenditures of four tobacco companies using data from 1956 to 1979 for twelve brands and reported that advertising showed a positive effect on brand sales but had no effect on the sales from brand family. The author further stated that brand advertising had a negative effect of rival firm sales. Additionally, Pollay, Siddarth, and Siegel (1996) examined advertising and sales to adults and adolescent consumers for nine brands of cigarettes from 1974 to 1993 in the United States. Results showed that brand level advertising increases market share.

Summary of Findings from Tobacco Industry

To conclude, findings from research on tobacco advertising and consumption (sales, market share, and so on) in the case of cigarettes provide mixed results. There is a lack of consistent empirical evidence linking aggregate cigarette consumption to aggregate advertising expenditures (Duffy, 1996). The effect of tobacco advertising on the demand for tobacco products is a heated topic in the research literature and has generated controversial and extensive debates. Advocates for tobacco advertising bans and restrictions assert that tobacco advertising has a positive effect on the demand for tobacco products. Supporters of this view contend that a ban on tobacco advertising will

help reduce demand for such products. On the other hand, researchers and practitioners contend that tobacco advertising does not affect the primary demand for tobacco products. They argue that tobacco advertising will, at most, influence the individual market shares of firms operating within the market. On the whole, past studies have shown evidence that supports both views.

A number of studies show that aggregate advertising does not have an impact on the aggregate consumption of tobacco products (Grabowski, 1976; Schneider et. al, 1981; Yuclet and Kaynak, 1984; Baltagi and Levin, 1986; Johnson, 1986; Godfrey, 1986; Hoffman, 1987; McAuliffe, 1988; Baltagi and Levin, 1992; Wilcox and Vacker, 1992; Duffy, 1991; Franke, 1994; Duffy,1995; Goel and Morey, 1995; Duffy, 1996; Gallet, 1999; Duffy, 2003). On the other hand, there are a number of studies finding that advertising does have a significant and positive effect on aggregate demand for tobacco products (Fujii, 1980; Witt and Pass, 1981; Young, 1983; Bishop and Yoo, 1985; Radfar, 1985; Leefland and Reuijl, 1985; Abernethy and Teel, 1986; Porter, 1986; Chetwynd et. al, 1988; Kao and Tremblay,1988; Harrison et. al,1989; Seldon and Doroodian, 1989; Tegene, 1991; Smee, 1992; Valdes, 1993; Tremblay and Tremblay, 1995).

There is empirical evidence to support the contention that advertising at the brand level has an effect on brand level sales (Wilcox, 1991; Nguyen, 1987; Pollay et. al, 1996). Some scholars such as Watterson (1990) contend that tobacco advertising is best understood in the market context of brand preference, considering rival product advertising. In addition, advertising in print media shows an effect on sales (Abernathy

and Teel, 1986). Lastly, there is evidence of a negative relationship between advertising and sales, although this relationship is non-significant (Johnson, 1986).

Alcohol Industry

Several econometric studies find a positive and significant relationship between alcohol category advertising and category consumption, while other studies show that aggregate advertising has little effect on the aggregate consumption of alcoholic products. Results from numerous studies in the United Kingdom provide evidence of a positive relationship between advertising and sales. For example, Johnson and Oksanen (1974) found that for beer and wine categories advertising has a positive relationship with consumption. However, results from this study failed to find a positive relationship between total alcohol advertising and consumption. Furthermore, the authors report that this relationship does not seem to hold true for distilled spirits. Prest (1949) presented similar findings, indicating that advertising does not significantly increase the primary demand for distilled spirits. In another study based in the United Kingdom, McGuinness (1980) noted that total alcohol consumption is responsive to changes in advertising for distilled spirits. Similarly, Walsh (1982) found a positive relationship between advertising and consumption for beer, wine and distilled spirits. Additional evidence is provided by a later study; Duffy (1993) reported positive effects of beer advertising on consumption.

Franke and Wilcox (1987) examined the relationship between industry level advertising and per capita consumption of beer, wine and distilled spirits in the United States from 1964 to 1984. The authors used quarterly data and examine the advertising variable in six measured media, namely network and spot television, network radio, magazine, news paper supplements and outdoor advertising. Findings from this study suggest that there is no significant relationship between total advertising and consumption of beer. In contrast, the authors noted that significant relationships between consumption and advertising expenditures for wine and distilled spirits exist. However, the authors cautioned that although positive, the observed relationship between advertising and consumption is weak. In contrast, several studies conclude that in the United States beer advertising is positively and significantly related to consumption (Nelson and Moran, 1995; Duffy, 1990; and Selvanathan, 1991).

In a later study Fisher and Cook (1995) provided a comprehensive analysis of beer, wine and spirits advertising in the United States. The authors found that beer consumption was related to demographic changes, particularly with increases in the number of individuals in the 20 to 34 year old age bracket. The authors indicated that changes in yearly advertising do not appear to produce a statistically significant effect on changes in consumption for beer, wine and distilled spirits. Fisher and Cook noted that when beer consumption increases, wine and spirits advertising is low. They explained this behavior by suggesting that total alcohol consumption is a system of declared consumer choices among product substitutes; i.e. consumers may choose among product

categories to satisfy their consumption needs and advertising may influence this selection.

Similarly, Nelson and Moran (1995) found that a significant relationship exists between alcohol categories. The authors noted that when wine advertising increases the consumption of distilled spirits decreases. Similar to the finding of Fisher and Cook (1995) these results from these two studies suggest that consumers select alcoholic beverages across categories and advertising may influence that selection. Nelson and Moran (19995) also asserted that total alcohol adverting has little impact on the total consumption of alcohol but serves to impact the selective demand i.e. firm level sales. Findings of this study suggest that while advertising may drive primary demand, it also has a positive effect on selective demand of similar products. The authors noted that consumers often selectively switch between product categories to satisfy their consumption needs. In doing so, a consumer may switch between segments within a category, and advertising in particular influences that decision (Fisher and Cook, 1995).

Wilcox (2001) found that advertising had a significant and positive effect on per capita consumption of beer over a twenty year period. Further, the author noted that electronic media, specifically television and radio, had a significant positive relationship with consumption. More recently, Wilcox and Gangadharbatla (2006) conducted a comprehensive analysis of advertising expenditures and aggregate consumption in the beer industry for a period of 33 years. Findings from this study were contrary to previous aforementioned literature. The results of this study suggest that advertising had little

effect on aggregate consumption of beer in the United States from 1970 to 2003. Findings of this study seem to be congruent with those of Bourgeois and Barnes (1979), who found little correlation between alcohol advertising and per capita alcohol beverage consumption in Canada from 1951 to 1974.

Summary of Findings from Alcohol Industry

On the whole, evidence from the research on the effect of alcohol advertising suggests that aggregate advertising expenditures for alcoholic beverages do not affect the primary demand for these products. Instead, advertising serves as a competitive market tool which aids consumers in their selection of category of alcoholic beverage. Several studies reported a significant and positive effect of advertising expenditures on consumption of the category of alcoholic products, such as beer, wine and distilled spirits (Walsh, 1982); beer and wine (Johnson and Oksanen, 1974); beer (Duffy, 1993; Wilcox, 2001) and wine and distilled spirits (Franke and Wilcox, 1987). In addition, electronic media appears to have a significant effect on alcohol consumption variables as compared to other forms of measured media.

Automobile Industry

Kwoka (1993) investigated the impact of advertising and styling features on sales in the auto industry in the United State over a 22 year period. Findings from this study showed that both product styling and advertising have a positive and significant effect on sales in the automobile industry in the United States. However, Kwoka underscored that the impact of advertising on sales is short-lived, while product styling tends to have a

longer impact on sales. In addition, results from this study showed that sales of a given firm are not affected by rival firm advertising. Thus, this finding provides evidence that market-wide advertising does not increase the total industry sales. Further, the author noted that the effectiveness of advertising on sales differs across segments of automobile. Specifically, advertising has the most effect on sales in the compact car category as compared to intermediate and standard car segments.

Additionally, Kwoka (1993) found that own firm sales are increased by rivalry advertising. Interestingly, results from a later study by Greuger, Kamerschen, and Klein (2000) found partial support for such results. Greuger, Kamerschen, and Klein (2000) used a sample of accounting data for the largest automobile firms in the United States, namely: Ford, General Motors (GM), and Chrysler from 1970 to 1992. Results from this study show that in two of the three cases rival advertising reduced GM's profitability while Chrysler and Ford were unaffected by rival advertising. Geroski and Murfin (1991) used firm-segment aggregated data; results of this study are in line with Greuger et. al (2000), rival advertising expenditures appeared to reduce the market share of own firm. In contrast, Geroski and Mazzucato (2001) examined the U.S. industry over a period of 42 years from 1954 to1996. The authors found no evidence to support the notion that rival firm advertising increases own firm sales.

In a notable study on the United Kingdom automobile industry Cowling and Cubbin (1971) conducted studies to estimate the effect of advertising on sales in the automobile industry. Results from this study revealed that advertising expenditures had a significant and positive effect on sales for auto firms in the United Kingdom. Similarly,

results from a study conducted by Peles (1971) showed that advertising expenditures had a positive and significant effect on the future sales of automobiles.

Summary of Findings from Automobile Industry

In sum, the research on automobile advertising and consumption shows that advertising has a significant and positive effect on sales for automobile firms although this effect may be short lived (Cowling and Cubbin, 1971; Kwoka, 1993). In addition, research shows evidence of a "goodwill" effect of advertising—that is current advertising has a positive impact on future sales (Peles, 1971). Also, there appears to be mixed results in terms of rival advertising and own firm sales. Results from two recent studies provide evidence that rival firm advertising may reduce own firm sales (Geroski and Murfin, 1991; Greuger et. al, 2000). However, in a later study examining the automobile industry in the United States over 42 years, Geroski and Mazzucato (2000) did not find evidence for this finding.

Miscellaneous Products

In a classic study using published sales data from a patent medicine company, Lydia Pinkham, Winer (1979) found that advertising produced little carry over effects over time, while current advertising seemed to produce an effect in a given period. Several scholars concurred that the returns on investment of advertising are typically diminishing in nature—the first exposure gains the most increase in short term sales or

market share (Tellis, 1988; Deighton, Henderson and Neslin, 1994; Naples, 1979; Jones, 1995a, 1995b; and McDonald, 1971).

Ouyang, Zhou and Zhou (2002) sought to test the existence of a long-term impact of advertising on the sales of consumer durables such as color television sets, refrigerators, washing machines, microwave ovens, and video CD/VCD players in China. Results from this study showed that temporary advertising efforts resulted in a long-lasting sales increase for ten leading brands of consumer durable goods in China.

In a recent study Zhou , Zhoue and Ouyang (2003) used cross-sectional time-series data of advertising and sales to examine the effect of short-term advertising on the sales of durable and non-durable goods in China. The results from this study suggest that advertising has a long term impact on sales of consumer durables such as color television sets, air conditioners, washing machines, and refrigerators. On the other hand, advertising expenditures does not appear to have a long term effect on sales of non-durable consumer goods such as skincare items and shampoo in China.

Summary of Findings from Miscellaneous Industries

All in all, studies under the miscellaneous product category look at the effect of advertising on sales in different product categories from consumer durables such as consumer electronics, to non-durable consumer products such as medication, skin care items and shampoo. On the whole, results from these studies provide insight into the relationship between advertising and sales in industries not before studied. The major

takeaways from the empirical research in this category include evidence that current advertising expenditures produce a positive effect on current sales (Winer, 1979). For consumer durable products, advertising appears to have long-term effect on sales (Ouyang et. al, 2002; Zhou et. al, 2003). Conversely, for non-durable products advertising does not have a long term effect on sales (Ouyang et. al, 2002; Zhou et. al, 2003).

Food and Food-Related Industries

The question of advertising's overall role in the drink and tobacco markets, both in the United States and worldwide, has attracted the most attention by academics over the past twenty years. The current area of debate has now shifted the focus towards the effect of food advertising on sales, yet relatively little academic research has yet been conducted (Luik, 1996). In this section of the review, the few empirical works focused on food and food related items are presented.

In a notable study, Duffy (1999) investigated the effect of food advertising on consumption over a period of twenty-seven years in the United Kingdom from 1969 to 1996. Specifically, this study examines the influence of food advertising on consumer preferences and behavior for eleven broad product categories, namely: Bread and cereals, Meat and Bacon, Fish, Milk, Cheese and Eggs, Oils and Fats, Fruit, Potatoes and Vegetables, Sugar, Preserves and Confectionery, Tea, Coffee and Cocoa and Soft drinks. The author concluded that advertising does not have any "meaningful effect upon

consumer preferences over most goods," noting that there is evidence to support "the view that consumer preferences for only 'meat and bacon' and for 'coffee, tea and cocoa' may be stimulated by advertising" (Duffy, 1999, p. 13). Results from this study show no evidence of an advertising effect on food consumption at the aggregate level. In addition, Duffy contended that results from this study show that advertising has no impact on the share of household budgets devoted to food consumption.

It is important to note that advertising for food and food related products takes place in the context of many interconnected markets such as advertising for other product types as well as in the backdrop of information on health, and diet (Duffy, 1999). That is, advertisers provide positive information to consumers via advertising about their product or brand, while concurrently consumers may be faced with negative information about their products (fats, dairy, and so on) by medical, health and legislative bodies, as well as positive information about other food products (fish, whole grains, fruit, and so on). In certain circumstances, these messages may reinforce one another, that is, a positive firm level advertising message may reinforce a public positive message. Ippolito and Mathios (1995) provided empirical evidence in support of the reinforcing effect of advertising. The authors examined changes in U.S. fat and saturated-fat consumption over two time periods, namely 1977 to 1985 and 1985 to 1990. During the first time period (1977 to 1985) the United States government agencies spread public messages in the media warning about the link between the intake of fats and related disease risks. During the second period in this study (1985 to 1990), a regulatory ban was lifted, allowing firms to make health claims in labeling and advertising. Results from this study showed that while

consumers react to the information throughout both periods in the study, the rate of change significant increases in the second period when firms can make health claims in their advertising and packaging.

On the other hand, the positive information firms supply by their advertising may be combated by negative information about their products (fats, dairy, and so on) by medical, health and legislative bodies. For example Cox (1992) examined the effect of butter advertising on consumption in the United States from 1978 to 1986. The author suggested that the unfavorable information regarding the product may have a much larger effect on demand as compared to the positive information spread through the industry's 'goodwill' advertising. These findings are consistent with those of Chang and Kinnucan (1991), who estimated an Almost Ideal Demand System (AIDS) for oils and fats in the Canadian market. Estimates from this study imply that advertising expenditures for butter, generic in type, lead to a decrease in demand. Further, the study estimates indicate that advertising has no impact on market shares for products within the fats and oil category. Similarly, Baye, Jansen, and Lee (1992) included advertising in an Almost Ideal Demand System for six product groupings in the United States, including food. The authors noted that "advertising does not generally have a statistically significant positive effect on the demand for the advertised good" (p. 1093).

Brown and Lee (1997) studied the demand for orange juice in the United Sates using an estimation of an advertising-augmented demand system for five brands of orange juice and a sixth category for all other juices and juice drinks. Results from this study show that generic and brand advertising appears to affect the aggregate demand for

orange juice, although the advertising elasticities are small. Specifically, the generic advertising elasticity for the orange juice is 0.03, thus a 100 per cent increase in orange juice advertising raises the total demand for orange juice by only three per cent.

Jensen and Schroeter (1992) conducted an econometric analysis of the consumption of fresh beef data and television advertising. Results from this study show that advertising campaigns do not increase, and may even have decreased, the panelists' demand for beef. On the other hand, Yiannaka and Giannakas (2002) tested the effectiveness of advertising on sales for 34 meat processing firms in Greece over a 14 year period, from 1983 to 1997. Yiannaka et. al (2002) find that total advertising by the firms is an important determinant of sales.

Henry (1996) provided a review of statistical evidence and argued that while advertising can be an effective tool of competition between brands, in mature food markets advertising does not appear to have an effect on total market size. Rather, the author suggested that increases in advertising volume "tends to be associated, if only slightly, with a decrease in sales" (p. 19). Similarly, Duffy (1999) noted a negative relationship between advertising expenditures and consumption. Additionally, Goddard and Cozzarin (1992) executed a large-scale demand-system study for nine food groupings. Findings from this study provided mixed results with the elasticity for own-firm advertising appearing to be negative for several firms.

Aaker et. al (1982) analyzed the advertising and sales relationship within the cereal market in the United States for six brands of cereal using monthly data for approximately 16 years. Results from this study provided little evidence supporting an

advertising-sales relationship. The authors also applied two causal tests; the authors rejected the null hypothesis for the sales-to-advertising direction for only two brands: Rice Krispies and Life (only in the Pierce- Haugh test). Additionally, the authors rejected the null hypothesis for the advertising-to-sales direction for Corn Flakes; the authors noted that the Corn Flakes relationship is small in terms of explained variance.

Using quarterly data derived from various sources, Elliott (2001) examined whether there is a long-term, stable, equilibrium relationship between advertising and sales for food and drink industries in United Kingdom. Results from this study how that there is a long-run equilibrium relationship between advertising and sales for the UK food industry. However, no evidence to support a long-run advertising-sales relationship for the soft drink industry, suggesting that in this industry intense rivalry between firms may exist. Similarly, in the United States, Wilcox, Gangadharbatla and Kamal (2009) use OLS (Ordinary Least Squares) regression techniques to investigate the link between annual advertising expenditures and consumption for carbonated soft drinks from 1984 to 2007. The authors did not find significant relationship between aggregate advertising expenditures and aggregate consumption for soft drinks in the United States from 1984 to 2007.

Summary of Findings from Food and Food Related Industries

This section of the literature review surveyed the literature on advertising and the consumption of food and food related items. No consensus view appears evident from the

empirical work on aggregate and brand advertising within these markets. There are a few key points in the empirical evidence. First, it appears that generally aggregate level advertising does not impact the total demand or consumption for soft drinks (Wilcox, et. al, 2009) or cereal (Aaker, 1982). There is evidence to support the contention that advertising has an effect on sales for meat and bacon products (Duffy, 1999); meat (Yiannaka et. al 2002); coffee, tea, and cocoa (Duffy, 2001); generic and brand orange juice (Brown and Lee, 1997); and other food items (Elliot, 2001). Interestingly, several studies have reported a negative relationship between advertising and sales for food items (Duffy, 1999; Goddard and Cozzarin, 1992). Some argue that this is due to the maturity of the food market and advertising is only effective in competition between brands. Lastly, advertising may have a reinforcing effect when firm level "good will" advertising is in conjunction with public messages enforcing the consumption of certain foods, diet, and disease related messages (Ippolito and Mathios, 1995). In the same way, unfavorable or negative public messages regarding the consumption of certain food products may have a larger effect on the demand than compared to positive firm level information (advertising) supplied by the industry (Cox, 1992).

An Overview: Quick Service Restaurants (QSR)

The QSR industry is an important U.S. industry in terms annual sales, expenditures in advertising and brand value estimations. There is a lack of studies that examine the effect of advertising expenditures in growing food markets (Luik, 1996;

Duffy, 1999). Despite the growing concern regarding the effect of food advertising expenditures on consumption; no previous research has examined the QSR industry. Bearing, this in mind the current study investigated the relationship between advertising expenditures and sales revenues in the Quick Service Restaurant (QSR) industry in the United States from 1986 to 2007.

This section of the literature review examined the Quick Service Restaurant (QSR) industry in detail. First, a short history of quick service food in the United States is presented. Following this, QSR is defined and pertinent industry information, market structure, and leading companies are discussed. In the conclusion, the importance and value of the QSR industry is examined as well as the objective of the study and its contribution to research and practice.

A Brief History of Quick Service Restaurants

The term "fast-food" first appeared in the Merriam and Webster dictionary in the 1950s and is defined as:

> "Fast food (*noun)* —1**:** of, relating to, or specializing in food that can be prepared and served quickly <a *fast–food* restaurant> 2**:** designed for ready availability, use, or consumption and with little consideration given to quality or significance."

The history of "quick service" or "fast-food" in the United States can be traced back to the 1920s when a fast food restaurant by the name of Horn and Hardart was opened in New York City (National Public Radio, 2002). This is the early predecessor of modern day QSR firms. The format of the restaurant was called an "automat" which featured ready to eat foods which were dispensed to customers behind a small glass window and coin-operated slots. The concept of automats and quick prepared meals became very popular in the United States during the 1920s and 1930s. Many similar automats began to emerge across the country. Horn and Hardart was the first company to popularize the concept of "take-out food" which was easily and quickly available to consumers at a low cost.

With the increasing popularity of automobiles after the First World War, the concept of drive-in restaurants came into being. In 1921, based in Wichita, Kansas, Billy Ingram and Walter Anderson opened the first known QSR restaurant known as "White Castle" (Hogan, 1997). The restaurant offered limited menu items at low cost and high speed. Nearly two decades later, McDonald's, the world's largest fast food chain, was founded in 1940 by two brothers, Dick and Mac McDonald. Upon realizing that a majority of their sales were derived from hamburgers, the brothers developed a walk-up stand concept offering limited and inexpensive menu items, which were served instantaneously and in disposable packaging (McDonald's Corporation, 2007).

The McDonald brothers were heavily influenced by the production lines innovation of Henry Ford and developed their own production method that was named

"Speedee Service System". This system allowed them to increase their burger production turnover significantly. The restaurant was eventually bought by a salesman, Ray Kroc, in 1961. Within ten years Ray Kroc transformed the small scale McDonald's Corporation franchise into a nationwide business. The goal of the company was the provision of inexpensive, ready-to-go hamburgers, french-fries and milkshakes. The success of McDonald's brought about new entrants into the QSR market. Following the McDonald's model, Keith Cramer in Florida began a fast-food hamburger restaurant which eventually became the Burger King Chain. Similarly, in 1962, Dave Thomas opened his first Wendy's restaurant in Columbus, Ohio. By 1990 there were almost 11,803 McDonald's, 6,298 Burger King's, and 3,721 Wendy' s fast-food establishments in the United States.

Market Definition, Structure and Related Information

Definition– What is QSR?

Overall, the fast food industry in the United States is a part of the foodservice industry. The Census defines eating places (SIC 5812) as all retail established that offer full service or quick service restaurants, commercial cafeterias, social caterers, and ice-cream (or frozen yogurt) stands as well as contract feeding. This category of firms does not include bars and taverns. The restaurant industry is a leading category within the food service sector. Full services restaurants are most commonly characterized by the use of table service where the food is consumed on the restaurant premises. On the other hand, limited or quick service restaurants (QSR) are those establishments that do not provide

any table service and typically these establishments offer a limited number of menu items. Because the QSR industry is characterized by firms that provide a limited scope of menu items the participants within this market are meaningfully categorized by the product offerings (i.e. Burger, Pizza, Chicken, and so). In 1992, the Census of Retail Trade provided a breakdown of state level sales for twelve types of fast food establishments. From these categories the leading segments are burger, pizza and chicken which represent 43.6, 15.0 and 8.8 percent of total QSR sales in the U.S., respectively.

Datamonitor (2007) defined the fast food industry as "the sale of food and drinks for immediate consumption either on the premises or in designated eating areas shared with other foodservice operators, or for consumption elsewhere" (p.6). Similarly, Chou, et. al (2005) define QSR as restaurants "primarily selling limited lines of refreshments and prepared food items. Included are establishments which prepare pizza, barbecued chicken, and hamburgers for consumption either on or near the premises or for "take-home" consumption".

The fast food industry in the United States falls into four major segments: 1) Quick Service Restaurants (QSR); 2) Takeaways; 3) Mobile and Street Vendors; and 4) Leisure Locations. The QSR market, which is the focus of this study, accounts for the foremost segment in the industry, represents for over 73.3 percent of the United States fast food market.

QSRs are defined as "locations where the primary function is to provide full meals but where table service is not offered" (Datamonitor, 2007, p.7). Furthermore,

QSR sales represented over 41.6 percent of the aggregate restaurant sales in the United States for 2007. Not only is the QSR a lucrative segment of the U.S. Restaurant industry, it is also projected to grow 4.4 percent within the next year, to reach annual aggregate sales of $ 59.7 billion dollars in 2008 (Datamonitor, 2008).

The QSR market is a highly competitive one and thus leading companies must invest heavily on advertising to attract consumers from their competitors (Hoovers, 2009). According to Datamonitor (2008) QSR firms "differentiate their offering through the range of foods; the major chains in particular invest heavily in brand-building, through advertizing, the uniform visual style of their outlets, and so on. This strengthens customer loyalty, and weakens buyer power" (p.14).According to the latest industry reports by Datamonitor (2007) the buyer power in the industry is weak to moderate. This is due to the fact that the market players differentiate their product offering largely through heavy investments in advertising as well as the uniformity of their outlet styles and other brand-building activities. This creates strong consumer loyalty which in turn reduces brand switching, and retards price sensitivity, thereby reducing the buyer power in the market.

Currently, QSR sales are also increasing—according to the Bureau of Labor Statistics (BLS), total expenditures on fast-food from food away from home spending increased from 33 per cent in 1976 to 42 percent in 1986 to 49 percent in 2007. Furthermore, statistics published by the Census of Retail Trade, show that the per capita number of fast-food restaurants has doubled from 1972 to 1997 (Stewart, et. al, 2004).

Importance of Industry – Why QSR?

Perhaps one of the major changes in eating habits in America over recent decades is the increase in demand for food eaten away from home or FAFH (Binkley, 2006). National expenditures for FAFH have increased rapidly from 33 percent of total food expenditures in 1970 to 49 percent by 2007 (Bureau of Labor Statistics, 2008). A vast majority of FAFH expenditures are attributed to table service restaurants and quick service restaurants (QSR). Many factors contribute to the growth in FAFH expenditures, such as the rise in household incomes, increase in female labor force, and so on (Byrne, Capps, and Saha 1998; Kinsey 1983; McCracken and Brandt 1987; Prochaska and Schrimper 1973; Redman 1980; Yen 1993). However, generally income is a more important factor the increase in demand for table service than compared to quick service restaurants (Jekanowski, Binkley, and Eales 2001; McCracken and Brandt 1987).

In The New Economics of Fast Food, the author Robert L. Emerson starts his book with a gloomy portrayal of the QSR industry future. Emerson (1990) contended that two major factors are likely to adversely impact the restaurant and QSR industry in the United States in the coming years. The first factor is industry saturation and the second is the declining rate of young people (major consumers of fast food). During the same time that Emerson published his book, several prominent business magazines such as Business Week and the Wall Street Journal also cautioned about QSR growth and long term success. For example, an article published by Business Week on January 8, 1990, reported a dearth in growth opportunities for fast food industries (pg. 90). In another

article in the Wall Street Journal on October 23, 1989, managers of major QSR firms such as KFC and Wendy's stated that the industry is overbuilt and many franchisees of QSR firms will not be able to succeed.

Despite these dire predictions, these concerns have not been realized as yet. In fact the overall fast-food industry is growing. Sales increased in 1990 from 69.5 billion dollars to approximately $ 103.5 billion dollars nationwide in 1997. The increase in sales reflect the gradual shift in food consumption and eating patterns of U.S. consumers, favoring foods eaten outside of home. In 1986, the share of total food expenditure spent on FAFH was 42 percent by 2007 this percentage is 49 percent (Bureau of Labor Statistics, 2008). In fact, even during recessionary times, sales of fast-food franchises grew by 11 percent (Kara, et. al, 1997). Over time, QSR has been one of the fastest growing segments of the FAFH industry.

The QSR market is a prominent feature of the U.S. economy. Recent forecasts show that by 2011 the fast food market is predicted to be valued at $66.2 billion—an approximate 20 percent increase since 2006 (Datamonitor, 2007). The quick-service restaurant segment accounts for more than one third of the total dining industry, with aggregate sales in 2007 over $42.3 billion (Datamonitor, 2007). Not only is it a prominent national industry, but the QSR market in the U.S. is also vital at an international level. The QSR industry in the United States represents 53.8 percent of the global QSR market's value, making it an industry of global importance (Datamonitor, 2007). The QSR market, accounts for the foremost segment in the industry, accounting

for over 73.3 percent of the United States fast food market, other segments include takeaways; mobile and street vendors; and leisure locations.

Advertising expenditures for the overall food industry is one of the leading categories of advertisers in the United States food. Expenditures for national advertising for 'food, beverage and candy' and 'restaurant' categories combined totaled $ 12,516.7 billion (Adage.com, 2007). The food industry is a leading supporter of local, cable television and network as well as other forms of public media such as newspapers, magazines, billboards, and radio (Blumenthal and Goodenough, 1998; Gallo, 1999; Story, Neumark-Sztainer andFrench, 2002). Annually over $30 billion is spent on the promotion of food products (Gallo, 1999).

The QSR industry specifically, is a significant and growing industry in the United States. It is also a highly competitive industry (Chou, et. al, 2005) and thus is heavily advertised. It is approximated that the QSR industry alone spends over $4 billion annually in advertising expenses (Schlosser, 2006). QSR firms tend to allocate a large portion of their media budgets to electronic media namely various formats of television (Gallo, 1999). Studies claim that television in particular is a popular medium among QSR advertisers as it delivers large audiences, so even a small proportion of television viewers affected by advertisements are likely to be relatively large in number (Gallo et. al; Warner, 1987). Thus, the QSR market represents an important industry for the advertising economy in the United States.

In a recent brand evaluation report by Millward Brown (2008), many QSR firms rank among the most powerful brands in terms of global brand equity, as well as secure top estimates in terms of their brand value. These results further signal how crucial a role branding and advertising play in this industry.

Table 1 : Estimated Brand Value for QSR Brands

Brand	**Brand Value[1] (Millions USD)**
McDonalds	$ 49,499
Subway	$ 10,355
KFC	$ 6,100
PizzaHut	$ 3,222
Taco Bell	$ 1,914
Wendy's	$ 1,763

Source: Millward Brown (2008).

Leading Companies

This study examined the effect of advertising expenditures on sales for the leading companies within the QSR market (See Table 2). That is, McDonald's, Wendy's, Sonic, Jack-in-the-Box, PizzaHut, Domino's, Subway, KFC, and TacoBell rank among the top 15 brands of overall QSR sales for 2007. Furthermore, the above mentioned brands enjoy

[1] The valuations in the BrandZ Ranking are based on data from three resources: financial data and projections for all companies featured in the ranking are publicly available and sourced from Bloomberg; primary research data on brand related indicators is derived from the BrandZ database, the world's largest brand equity database for which Millward Brown has interviewed 1 million consumers and business-to-business customers across 31 countries to compare thousands of brands; data used to analyze category performance was sourced from Datamonitor (www.datamonitor.com) and company financial reports.

the top 5 rank within their respective QSR segments. The collective sales of the study sample of firms accounts for ninety-four percent of total QSR sales in 2007 in the U.S. In addition, the collective sales of these nine firms represent over seventy percent of sales in the entire fast food market (including aggregate U.S. sales from Quick Service Restaurants, Takeaways, Leisure Locations and Mobile & Street Vendors) in 2007. These calculations were based on the Datamonitor 2008 U.S. Fast-Food Industry Report.

Table 2: Leading QSR Companies in the United States 1986—2007

Brand	**Rank (QSR Top 50)**	**Rank (QSR Segment)**
McDonald's	1	1 (Burger)
Wendy's	3	3 (Burger)
Subway	4	1 (Sandwich)
TacoBell	5	1 (Mexican)
KFC	7	1 (Chicken)
PizzaHut	8	1 (Pizza)
Domino's	11	2 (Pizza)
Sonic	10	4 (Burger)
Jack-In-the-	15	5 (Burger)

Source: Adapted from QSR Magazine Top 50, 2007

Summary of QSR Overview

To date there is a lack of studies that examine the effect of advertising on sales in the QSR market. The QSR market is an important sector within national economics in terms of its annual sales, expenditures in advertising, and brand value. On the whole, the

QSR industry is a significant and growing industry in the United States. It is also a highly competitive industry (Chou, et. al, 2005) and thus is heavily advertised. In light of prior research on the relationship between advertising and sales, the current study's research hypotheses are derived from the concept that companies employ advertising to increase their overall market performance.

Summary

To conclude, this chapter presented an overview on empirical studies examining the effect of advertising on consumption variables, namely sales. In addition, findings from specific industries (tobacco, alcohol, automobile, miscellaneous products and food and food-related items) were discussed at length. These industries were reviewed in depth as there is a lack of research in the QSR industry. Based on the review of literature, Chapter 3: Research Hypotheses, will put forth the research questions and hypotheses of the current study.

CHAPTER 3

RESEARCH HYPOTHESES

Introduction

In this chapter, the research hypotheses of the current study are presented. The empirical and theoretical evidence for the development of each research hypothesis will also be covered in this chapter. The aim of the current study was to provide a comprehensive analysis of the relationship between advertising expenditures and sales revenue for the QSR industry as well as the nine leading companies in the QSR industry, over a twenty-two year period in the United States. With these goals in mind, three research questions were established: 1) How does aggregate advertising expenditures affect aggregate sales in the QSR Industry based on 1986 to 2007 in the United States?, 2) How does aggregate advertising expenditures by each media (electronic, print and outdoor) effect sales in the QSR Industry based on 1986 to 2007 data?, and 3) How does advertising by each media (electronic, print and outdoor) effect sales of each QSR firm in the United States within the observed period of time?

In order to answer these research questions, the study proposed three hypotheses. The three research hypotheses to be tested can be divided into two sets: 1) "aggregate,"

which pertains to the QSR industry level advertising and sales data[2]; and 2) "brand," which deals with the individual QSR firms level advertising and sales data.

The research hypotheses pertaining to aggregate level data are first presented. In particular, the two hypotheses presented in this set predict the: (1) the positive relationship between aggregate advertising expenditures and aggregate sales revenues, and (2) the positive relationship between aggregate advertising expenditures by media type (electronic, print and outdoor) and aggregate sales revenues. Next, individual brand level hypotheses and the corresponding empirical support are discussed. In this set of research hypotheses the relationship between advertising and sales at the brand level are explored. More precisely, the hypotheses in this set predict: (1) the positive relationship between brand advertising expenditures by media type (electronic, print and outdoor) and brand sales revenues. The chapter concludes with a summary of the proposed research hypotheses and a brief introduction to Chapter 4: Methodology.

[2] The aggregate level data is the sum of all nine QSR firms used in the current study. It should be noted that while this set of QSR firms does not encompass all the firms operating within the QSR industry; this sample of firms represents the top ten QSR companies in the market. The aggregate sales of the current sample represent ninety-four percent of total QSR sales in 2007 in the US. In addition, the collective sales of these nine firms comprise over seventy percent of sales in the entire fast food market (including aggregate US sales from Quick Service Restaurants, Takeaways, Leisure Locations and Mobile & Street Vendors) in 2007.These calculations were based on the Datamonitor 2008 US Fast-Food Industry Report.

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Research Hypotheses

Aggregate Advertising Expenditures and Sales Revenues (Hypotheses 1 & 2)

In a classic study regarding the economic effects of advertising, Neil Borden (1942a) stated that the effect of advertising on the demand for products has no general answer. Specifically, Borden argued that depending on the nature of the market and the stage which the product is at, advertising may play different roles. The author notes that in an expanding market, advertising is likely to have a positive effect on demand at the aggregate level. On the other hand, in markets experiencing a decline, advertising is likely to affect selective demand, that is advertising is more likely to affect brand market share. The author goes on to distinguish between advertising effects on primary and selective demand of products. Primary demand is when advertising impacts the demand for the overall industry. Selective demand, as mentioned earlier, occurs when advertising affects the demand of products at the firm or brand level. In this case, the role of advertising is to rearrange the market share among firms within a given industry, but not to grow the demand for the entire industry.

In a important article published in the Journal of Marketing, Borden (1942b, p. 97) stated that: "advertising and aggressive selling have had their greatest influence on investment in new industries, though they have also helped to increase the demand' for the products of established industries". The QSR industry is a relatively new industry in the United States and the observed period of time examined for this study was a period of rapid expansion and growth for the QSR market. Thus, in light of Borden's findings, a

positive and significant relationship between aggregate advertising expenditures and QSR aggregate sales is expected.

In fact, studies from various industries provide empirical evidence to support the contention that aggregate advertising expenditures have a positive impact on the aggregate level of consumption such as sales and/or market share. Because no study investigating the advertising-sales relationship has focused on the QSR industry, this study draws from findings of other industries to see whether there is a similar trend in the QSR industry. Specifically, evidence from the alcohol, tobacco and food/food related items are presented. The review of empirical literature (Chapter 2) examined and discussed each study in considerable detail, and this chapter focuses on key highlights from previous research in an effort to provide the rationale for each research hypothesis.

Over the past two decades the effect of advertising on the consumption in drink and tobacco markets has been an area of active research. In the case of the alcohol industry many studies note the presence of a positive impact of advertising on aggregate sales for various alcohol products. Walsh (1982) noted a positive relationship between advertising and consumption of beer, wine, and distilled spirits. In a more recent study, Duffy (1993) reported similar results, stating a positive effect of total beer advertising on aggregate beer consumption in the United Kingdom.

With regard to aggregate tobacco consumption, numerous studies have also shown a positive relationship between advertising and consumption. In a study about the cigarette industry in the United Kingdom, Mc Guinness and Cowling (1975) found that

sales were positively affected by advertising from 1957 to 1968. Borden (1942) analyzed the effect of advertising expenditures on the primary and selective demand for cigarettes in the United States from the late 1800s to the late 1930s. The author noted that advertising is an important factor in increasing primary demand for cigarettes. In later studies, Hamilton (1972) and Abernethy and Teel (1986) found a positive relationship between advertising expenditures and aggregate demand, although the authors noted that the advertising variables had small effect sizes. Similarly, Leeflang and Revijl (1985) examined the relationship between cigarette advertising and primary demand for cigarettes in West Germany. The authors stated that print advertising had a statistically significant relationship with aggregate consumption of cigarettes.

Presently, the research focus has shifted towards the effect of food advertising on sales, although academic research is still limited (Luik, 1996). The few empirical works focused on food and food related items provide evidence of the presence of a positive effect of advertising on the growth of food markets.

Ippolito and Mathios (1995) examined the effect of advertising on changes in fat and saturated-fat consumption over two time periods: 1977 to 1985 and 1985 to 1990, in the United States. Results showed that advertising may have a "reinforcing" effect when the level of a firm's advertising is in conjunction with public messages enforcing the consumption of certain foods. In an econometric study, Yiannaka et. al (2002) analyzed the effect of advertising on sales for 34 meat processing firms in Greece over a 14 year period, from 1983 to 1997. Yiannaka et. al (2002) found that total advertising by the

firms was an important determinant of sales. Similarly, Duffy (1999) reported a significant and positive effect of advertising on the sales of meat and bacon products. Additionally, Duffy noted a positive effect of advertising on the aggregate consumption of coffee, tea, and cocoa items in the United Kingdom from 1969 to 1996.

Thus, bearing in mind the collective empirical evidence provided by the previous research, the present study considers the relationship between aggregate advertising expenditures and sales revenues for the category of QSR firms. In exploring this relationship, two relevant factors affecting consumption were also taken into account: (1) price and inflationary effects on sales; and (2) population effects on sales. Aggregate sales for the category of QSR firms were divided by the total population to arrive at the per capita sales revenues. In doing so this study accounted for the changes in population on the dependent variable side of the equation. In fact, past econometric studies of advertising have also defined the dependent variable as per capita. That is, the dependent variable is divided by the total population to weight population effects on consumption. For example, Bass (1969) used simultaneous equation regression methods to analyze time series data for sales and advertising for filter and non-filter cigarette brands in the United States from 1953 to 1965. The author used per capita measure of sales by dividing the sales of filter cigarettes by the total population over 20 years old in the United States. In another study, Rao (1974) used different econometric models to describe the advertising-sales relationships for six major cigarette companies in the United States: R. J. Reynolds, American Tobacco, Liggett and Myers, P. Lorillard, Philip Morris, and Brown and

Williamson from for 1945 to 1965. In the first model, the author used per capita sales as the dependent variable to examine the effect of advertising on per capita sales from 1945 to 1965 for the six leading companies. Similarly, in a study analyzing the relationship between industry wide advertising expenditures and per capita consumption of beer, wine, and distilled spirits in the United States from 1964-1984, Franke and Wilcox (1987) used per capita consumption of gallons of alcohol consumed. Specifically, for the three alcoholic beverage consumption variables (beer, wine, and distilled spirits), the total consumption of the beverages in gallons was divided by the number of adults aged 21 and older to obtain per-capita consumption figures. In a later study, examining the effect of advertising on the consumption of beer in the Netherlands, Franses (1991) used per capita consumption of beer by dividing the total liters of beer consumed divided by the population aged over 15.

Second, to control for price this study used the Consumer Price Index (CPI) for Food Away from Home (FAFH) to adjust sales revenues for price and inflationary effects (Base 1982-1984=100). The CPI for FAFH measures the average price paid for food items purchased away from home by an average U.S. consumer and compares it to an earlier base year. As the CPI for FAFH is a weighted average of actually paid prices, it captures the price promotional effects within the market (Franses, 1991). Because no reliable and consistent record of QSR prices exists, the CPI for FAFH is the best measure of price to date. Previous research has also used CPI as a proxy measure for price. For example, in a similar study about cigarette consumption and advertising, Bass (1969,

p.293) stated that: “although it might have been desirable to include prices of the filter and non-filter cigarettes as variables, the non-filter price is available as a component of the consumer price index”.

Thus, based on the prior research, this study asserts the following hypotheses regarding advertising expenditures and sales revenue for aggregate level data:

H1: Aggregate advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

H2: Advertising expenditures by each media type will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

> **H2a:** Aggregate electronic advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.
>
> **H2b:** Aggregate print advertising expenditures will have a significant and positive effect relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.
>
> **H2c:** Aggregate outdoor advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

<u>Brand Advertising Expenditures by media and Sales Revenues (Hypothesis 3)</u>

Borden (1942b) stated that: “the possibilities for the use of advertising by individual companies vary widely. If the right combination of conditions is present, the effect of advertising is to increase the demand for the particular company's product” (p.

91). Results from Borden's classic study show that there is a strong effect of advertising on the selective demand among several major U.S. industries.

Past research indicates that at the brand level advertising has a positive and significant effect on brand consumption variables (such as sales and/or market share) (Wilcox, 1991, 2001; Nguyen, 1987; Pollay et. al, 1996). For example, Wilcox (1991) examined brand advertising expenditures and consumption of ten major U.S. brands of cigarettes from 1949 to 1985. The author noted that brand advertising expenditures had a positive relationship with brand consumption for five brands of cigarettes. In light of these findings he stated that: "advertising is a fairly important marketing tool and that when used effectively it may influence brand consumption" (p.65). In addition, Wilcox noted that the five brands that exhibited a positive and significant relationship between advertising and sales, also showed a high level market growth from 1949 to 1985. In another study Nguyen (1987) examined the effect of advertising by four tobacco companies using data from 1956 to 1979 for twelve brands. Findings from this study also showed a significant and positive effect of advertising on brand sales.

In a later study, Pollay et. al (1996) studied the effect of brand advertising on sales to adults and adolescent consumers for nine U.S. brands of cigarettes from 1974 to 1993. Similar to the aforementioned studies, results showed that brand level advertising increases market share for advertised brands. Recently, Wilcox (2001) found a significant positive relationship between brand advertising expenditures and consumption for leading U.S. beer brands. Others note that the advertising-sales

relationships may differ depending on the brand. For example, Lodish et. al (1995a) conducted a single source study to examine the effects of advertising on sales of advertised brands. Findings from this study suggest that advertising was positively correlated to sales in 33 percent of the cases within the study.

Several studies have examined the effect and role of multiple media outlets in an advertising campaign (Bharagava and Donthu, 1999; Edell and Keller, 1989; Confer, 1992; Confer and McGlathery, 1991; Tavassoli, 1998; Tavassoli and Lee, 2003). Results from these studies suggest that multiple media will generally improve consumers' effects on memory based judgments (Tavassoli, 1998; Tavassoli and Lee, 2003). For example, Edell and Keller (1989) found that when audiences are exposed to TV ads and later audio ads, the audio ads serve as a retrieval cue for the television advertising. In this case, radio ads improve the effectiveness of television ads by enhancing consumer recall which would ultimately lead to purchase. Thus, the use of these two mediums jointly is more effective in influencing the consumer towards purchase behavior than the use of a single medium. Similarly, studies have found that print advertising also enhances the effectiveness of TV advertising among targeted audiences when both ads are well coordinated (Confer, 1992; Confer and McGlathery, 1991). In light of these findings, and previous related research (Franke and Wilcox, 1987; Wilcox and Vacker, 1994; Wilcox, 1991, 2001; Wilcox, et. al 2009), the current study breaks down the advertising expenditure variable into three types of advertising media: Electronic, Print and Outdoor.

This is done in an effort to measure the effects of each advertising media variable on sales.

Deighton, Henderson, and Neslin (1994) discussed the theoretical effects that an advertising exposure can have on consumer's brand choice. The authors stated that advertising can have three effects 1) it can increase the probability that the consumer will switch to the advertised brands (brand switching), 2) it can increase or induce further brand purchase by the consumer (repeat purchasing), and 3) it can have no effect on brand selection.

Deighton et. al (1994) also distinguished between the current direct effect of brand advertising as well as the lagged direct effect of advertising on brand selection (purchase). In the case of current direct effects of advertising, current advertising (ADV_t, advertising at time t) is theorized to have a positive impact on sales in the current period (S_t, sales at time t). Aaker, Batra, and Myers (1992), Aaker and Day (1974), Lavidge and Steiner (1961) provided theoretical support for this contention stating the theory of hierarchy of effects. They assert that the primary role of advertising is to increase the awareness and beliefs about the advertised brand. According to these authors, if these efforts are successful, the consumer will be more likely to move towards brand purchase or trial. Past studies (Aaker and Day 1974, Mahajan, Muller, and Sharma 1984) employing the use of recursive econometric models, have also found support for the role of advertising in the hierarchy of effects. In the case of a lagged direct effect of advertising on brand selection, Deighton et. al (1994) argue that this is a result of past

advertising on current purchase. The authors asserted that lagged advertising is anticipated to have the same effect as current advertising does on brand selection (purchase) but the impact is diminished as compared to current advertising. This is attributed to the fact that past advertising is gradually forgotten by consumers (Aaker, Batra, and Myers 1992).

This study will consider the relationship of lagged and current advertising expenditures on sales revnues. In the hypotheses testing a lagged measure of advertising is used in accordance with previous empirical research (Leone, 1995a; McGuire, Sundgren, and Schneeweis, 1988; Fombrun and Shanley, 1990; Wilcox, 1991, 2001; Franke and Wilcox, 1987; Wilcox and Vacker, 1994; Wilcox et. al, 2009; Dean 1951; Jastram 1955; Vidale and Wolfe 1957; Nerlove and Waugh 1961). The results of this set of analysis are presented in Chapter 5. Additionally, in the Additional Analysis section of Chapter 5, the effects of current and lagged advertising are considered simultaneously using a new regression technique known as Persistence Modeling.

The relationship between brand advertising expenditure by media and brand sales revenues are examined in this study. In the brand level set of hypotheses, for each QSR firm, electronic advertising expenditures, print advertising expenditures and outdoor advertising expenditures are regressed on brand sales as the dependent variable. As with the aggregate models, price and inflationary effects on sales, and population effects on sales are controlled for.

In light of the aforementioned empirical research, the current study asserts the following hypotheses regarding advertising expenditures and sales revenue for QSR brand level data:

H3: Brand advertising expenditures by media will have a positive and significant relationship with sales revenues for the QSR firm sales in the United States from 1986 to 2007.

> **H3a:** Brand electronic advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.
>
> **H3b:** Brand print advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.
>
> **H3c:** Brand outdoor advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.

Summary

In summary, this chapter discussed the three research questions and three hypotheses and six sub-hypotheses to be examined by the current study. The first two research questions analyzed the relationship between aggregate advertising expenditures (total aggregate expenditures and aggregate expenditures by media) and aggregate sales revenues for the QSR industry. The second research question seeks to examine the relationship between brand advertising expenditures by each media and brand sales for each QSR firm. In order to answer these questions three hypotheses were suggested. All positive relationships were hypothesized for the three hypotheses: the positive

relationship between aggregate advertising and sales for the QSR industry; the positive relationship between aggregate advertising by media (Electronic, Print and Outdoor) and sales revenues; and the positive relationship between brand advertising expenditures by media (Electronic, Print and Outdoor) and brand sales revenues. The following chapter (Chapter 4: Methodology), describes in detail the research methodology used to test these hypotheses, the sample, study variables, and the procedure of analysis followed.

CHAPTER 4

RESEARCH METHODOLOGY

Introduction

In this chapter, the research methodology used to test the research hypotheses, study variables, and the data analysis procedure in the current study are discussed in detail. This study examines the longitudinal relationship between aggregate and brand advertising expenditures and sales revenues in the QSR industry in the United States, from 1986 to 2007. In doing so, the current study employs the use of secondary data to examine the relationship between advertising expenditures and sales revenues. A model-building approach was used to determine the significant subset of predicator variables for sales revenues. A stepwise regression analysis with backwards elimination of non-significant predicators is utilized to select a set of statistically significant predictor variables. This comprehensive analysis is addressed by selecting a subset of significant predictor variables affecting QSR consumption, i.e. sales revenues. Regression analysis is used in order to reach the final subset of predictor variables. In analyzing the relationship between advertising expenditures and QSR aggregate and brand sales revenues, this study takes into account critical factors expected to affect sales revenues such as population size, price, and inflationary effects.

The chapter is organized as follows. First, the study data and sample are discussed. Specifically, this section provides operational definitions of the study

variables, sources used for obtaining data, and the selection criteria established for the companies selected for this study. Next, the measurement of dependent and independent variables as well as the framework for analysis used in the study are explained. Following this, the data analysis procedure employed, time series analysis, is reviewed at some length. The next section presents an explanation of regression analysis, the data analysis procedure of the present study. The chapter concludes with a summary of research hypotheses to be tested in Chapter 5.

Data and Sample

The primary goal in developing the database was to select variables with continuous observations over the past twenty-two years that reflect advertising and consumption levels for QSR. It is important to note that there are no missing observations in the current dataset. In order to examine the relationship between advertising expenditures and sales in the QSR industry it is important to control for price, inflation and population effects which prior research has shown to be associated with sales revenues (Bass, 1969; Telser, 1962; Palada, 1964; Quandt, 1964; Franke and Wilcox, 1987). Based on prior empirical research these "other" variables are also incorporated into this study. To ensure that the dataset did not have any missing observations, only those variables with a reliable and continuous series were included. Table 3 below provides an overview of the variables, sources, and time periods.

Table 3: Variables, Sources and Time frame (Reported in USD Millions)

Variable	Definition	Source	Time frame
Aggregate advertising	Total annual advertising expenditures	Leading National Advertisers (LNA), Inc.	1986— 2007
Electronic advertising	Total advertising expenditures for annual electronic media	Leading National Advertisers (LNA), Inc.	1986— 2007
Print advertising	Total advertising expenditures for annual print media	Leading National Advertisers (LNA), Inc.	1986— 2007
Outdoor advertising	Total advertising expenditures for annual outdoor media	Leading National Advertisers (LNA), Inc.	1986— 2007
Media Unit Cost Indexes	Cost index for measured media in relation to an earlier base year (Base 1982-1984=100)	McCann-Erickson.	1986— 2007
Consumer Price Index— Food Away from Home (FAFH)	Average price paid for food items purchased away from home by an average U.S. consumer and compared to an earlier base year (Base 1982-1984=100)	U.S. Bureau of Labor and Statistics (BLS).	1986— 2007
Sales Revenues	Total yearly brand sales reported in U.S.D billions, in constant dollars (Base 1982-1984=100)	Technomic, Inc.	1986— 2007
Population	Annual U.S. population	US Bureau of Census.	1986— 2007
Annual Expenditure for Food Away from Home	Total sales from eating and drinking places for the year, in constant dollars (Base 1982-1984=100)	US Bureau of Labor and Statistics (BLS).	1986— 2007

Thus, the database included one QSR consumption variable: annual sales revenues; four advertising variables: aggregate advertising expenditures, electronic advertising expenditures, print advertising expenditures, outdoor advertising expenditures; two socio-economic variables: CPI for Food Away from Home (FAFH), Annual Expenditure on FAFH; and one demographic variable: population size.

Firm Selection and Criteria

Chou, Rashad and Grossman (2005) defined QSR as restaurants "primarily selling limited lines of refreshments and prepared food items. Included are establishments which prepare pizza, barbecued chicken, and hamburgers for consumption either on or near the premises or for take-home consumption".

To indentify the sample of QSR companies for inclusion in this study, three selection criteria were established. First, the QSR firm must be listed under NAICS (North American Industry Classification System) code as a "Limited Service Restaurant." The NAICS classification is an industry classification system which follows a supply based or production–oriented economic concept, that is to say, this system classifies economic units with similar production processes in the same industry. The NAICS is widely used in economic and financial studies and replaced the Standard Industrial Classification in (SIC) in 1997. For the purposes of the current study NAICS code will be used to indentify "limited service" restaurants. Second, the company must be present in the QSR Magazine Top 50 Ranking. Third, the firm's financial information and

advertising expenditure data must be available continuously for each year under review in this study. Due to the above stated criteria several companies were eliminated from the database if their information was not reported from 1986 to 2007. For example, Burger King was not included in the current study sample due to the lack of continuous and reliable observations for the firm through the observed period, specifically, 1986 to 2007. The sample of QSR firms used in the present study is presented in Table 4.

Table 4: Companies under Study (Listed in alphabetical order)

Company	Rank	Industry Code	Category
Dominos	11	**NAICS Codes:** 722211	Limited-Service Restaurants
Jack-In-the-Box	15	**NAICS Codes:** 722211	Limited-Service Restaurants
KFC	7	**NAICS Codes:** 722211	Limited-Service Restaurants
McDonald's	1	**NAICS Codes:** 722211	Limited-Service Restaurants
Pizza Hut	8	**NAICS Codes:** 722211	Limited-Service Restaurants
Sonic	10	**NAICS Codes:** 722211	Limited-Service Restaurants
Taco Bell	5	**NAICS Codes:** 722211	Limited-Service Restaurants
Wendy's	3	**NAICS Codes:** 722211	Limited-Service Restaurants

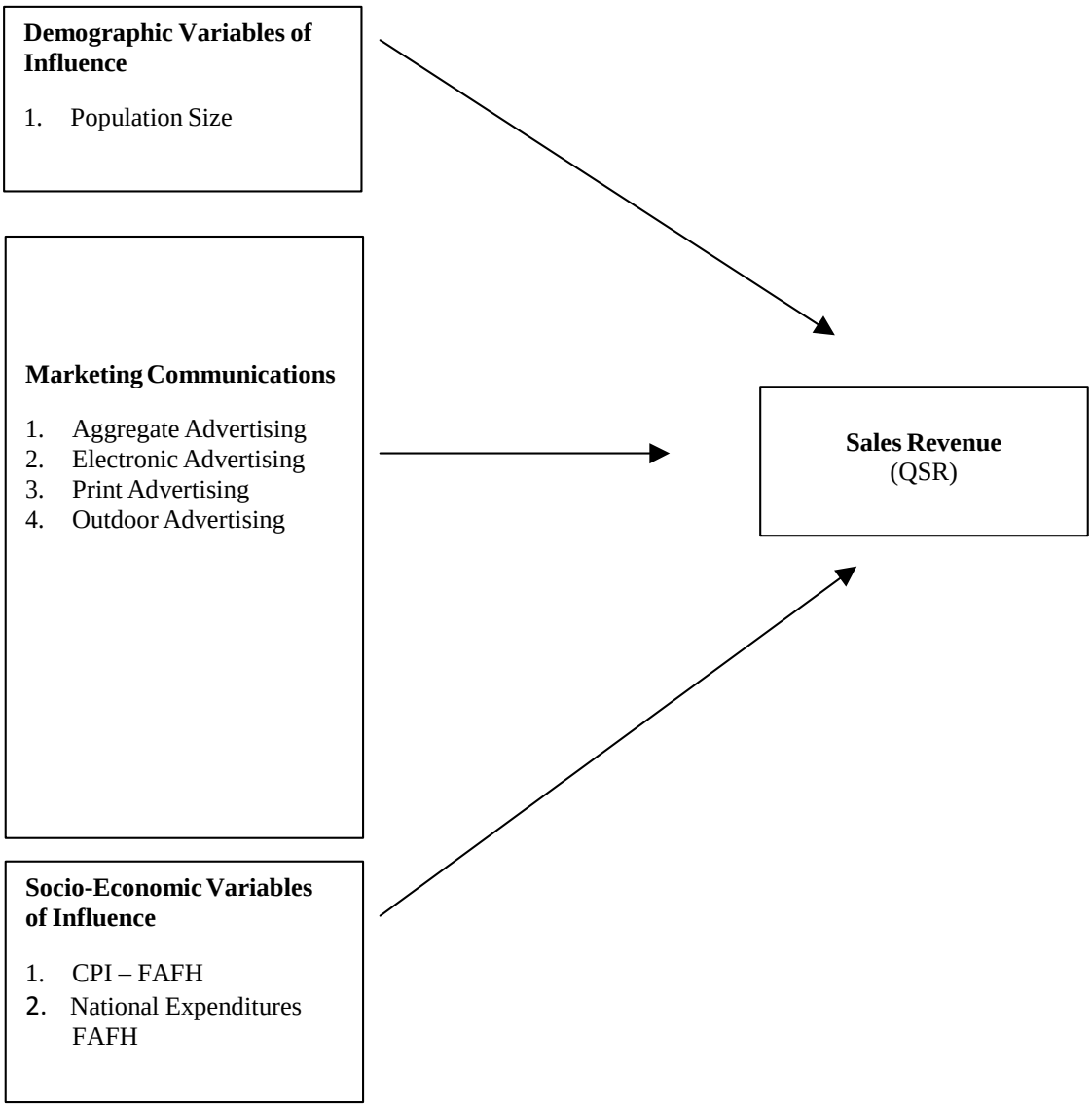
It should be noted that while this set of QSR firms does not encompass all the firms operating within the QSR industry; this sample of firms represents the top ten QSR companies in the market. The aggregate sales of the current sample represent ninety-four

percent of total QSR sales in 2007 in the U.S. In addition, the collective sales of these nine firms comprise over seventy percent of sales in the entire fast food market (including aggregate U.S. sales from Quick Service Restaurants, Takeaways, Leisure Locations and Mobile & Street Vendors) in 2007. These calculations were based on the Datamonitor 2008 U.S. Fast-Food Industry Report. The database includes the above stated variables (Table 3) for each QSR firm (shown in Table 4) from 1986 to 2007 in the United States. The following section provides a detailed definition and measurement of the variables used in this study.

Measurement of Variables

The major goal of this study is to analyze the effect of advertising on sales revenue. In doing this, the current study considers three sets of variables. Shown in Figure 1 the study variables were categorized into those related to marketing communications, socio-economic, and demographics. In the following section each variable in the study is discussed at length.

Figure 1: Framework for Analysis



Independent Variables

Aggregate Advertising Expenditures

The advertising variable is measured as a QSR firm total advertising expenditure reported on an annual basis. Thus, the aggregate advertising variable consisted of the annual media totals for each brand. While the definition and measurement of advertising is still a topic of heavy debate, most quantitative research has measured advertising in terms of the annual advertising expenditures (Balasubramaniana and Kumar, 1990; Ailawadi, Farris, and Parry, 1994; Zinkhan and Cheng, 1994; Herremans et. al, 2000; Yoo and Mandhachitara., 2003; Ailawadi et. al, 2003; Mizik and Jacobson, 2003; Fombrun and Shanley, 1990; Graham and Frankenberger, 2000). More recently, Wilcox, (2001), Wilcox and Gangadharbatla, (2006) and Wilcox, Gangadharbatla and Kamal (2009) measured advertising in terms of annual expenditures while examining its effect on consumption in the beer industry and soft-drink industry, respectively. Also, typically these researchers assume that advertising dollar expenditures also capture alternative execution choices such as psychological appeals and copy. It is important to note that these numbers may not reflect all or total advertising expenses by the company. However, these totals are still the best available measure of advertising expenditure on a continuous and annual basis to date.

It is important to note that in the context of this study that the term "brand" corresponds to the corporate brand of each QSR firm in the sample. Corporate brand refers to the brand of the overall firm or organization, while the product brand pertains to

the specific products of a given firm or organization (Keller, 2003). The corporate brand is distinguished from a product brand because it is boarded in its nature and typically encompasses "a much wider range of associations" (Keller, 2006, p. 75). Specifically, a product brand is defined by what the product does and represents, on the other hand, a corporate brand defines who the firm or organization is and what the firm or organization does (Keller, 2006).

The advertising expenditure data is obtained from the Leading National Advertiser's (LNA) Report. The LNA is a database that provides annual reporting of advertising expenses for companies across the United States. LNA is a national service which offers reports to subscribers about competitive advertising activity. This service reports on approximately 24,000 brands, and provides information on media budgets and a combination of media used by each brand. Following Schmalensee (1972) and Franke and Wilcox (1987) to ensure constant aggregation of advertising expenditures, the advertising series are deflated using the McCann-Erickson Media Cost Unit Index (Base 1982-1984=100). Based on previous empirical research (Franke and Wilcox, 1987) each advertising series is first deflated using the McCann-Erickson cost-per-thousand price index for the appropriate medium. Next, the deflated advertising series for the different media is summed to obtain the measures of aggregate advertising for each QSR firm.

A lagged effect of advertising variables (aggregate advertising, electronic advertising, print advertising, and outdoor advertising) on sales revenues was anticipated (Leone, 1995a; McGuire, Sundgren, and Schneeweis, 1988; Fombrun and Shanley, 1990;

Wilcox, 1991, 2001; Franke and Wilcox, 1987; Wilcox and Vacker, 1994; Nerlove and Waugh 1961). In order to account for a carryover effect, the current study used a lagged effect of a firm's advertising (year t-1) on its sales revenue in year t.

Electronic Advertising Expenditures

The electronic advertising variable consists of network television, spot television, cable television, syndicated television, network radio, spot radio, and online advertising expenditures for each QSR firm. Following Franke et. al (1987) each advertising series was deflated using the McCann-Erickson cost-per-thousand price index for each electronic media. Subsequently, the deflated advertising series was summed to obtain the measures of electronic advertising for each QSR firm (Wilcox and Vacker, 1992; Wilcox, 1991; 2001).

Print Advertising Expenditures

The print advertising variable is obtained by the summation of annual advertising expenditures for all print media for each QSR firm and includes magazine advertising, Sunday magazine advertising, newspaper advertising, and newspaper supplement. The aforementioned procedure of deflation was used to ensure the correct and constant aggregation of print advertising expenditures.

Outdoor Advertising Expenditures

Similarly, the outdoor advertising variable pertains to all outdoor advertising and billboard advertising expenditures annually incurred by each QSR firm. The price index for outdoor media was used to deflate this advertising series.

Annual Expenditures for Food Away from Home (FAFH)

Annual aggregate expenditures from 1986 to 2007 for sales of Food Away From Home (FAFH) were also included in this study. The FAFH variable includes the total includes sales from eating and drinking places, hotels and motels, retail stores and direct selling, recreational places, schools and colleges, and all other. All expenditure data was obtained through the US Bureau of Labor and Statistics (BLS) databases. The rationale of including annual expenditure for FAFH is to examine the effect of annual expenditures in the FAFH categories on corporate sales of QSR companies over this 22 year period.

To adjust for inflationary changes in FAFH expenditures, the annual expenditures for FAFH were converted to constant dollar scale (Base 1982-1984=100). The constant dollar formula expresses units of currency in terms of a designated base year value. The base year selected for this study is: Base 1982-1984=100 and is applied to each variable in the study for the sake of consistency. The underlying goal in converting dollar amounts to constant scale is to account for inflation, and in turn, provide a more accurate currency value in terms of purchasing power. This becomes especially important when comparing

the values of a currency between periods. The equation used to convert a currency amount to a constant dollar value is:

Second year Constant Dollar=First Year Dollar Value*((CPI for First Year)/ (CPI for Second Year)).

Dependent Variables

Sales Revenues

The consumption variable used in this study is annual sales reported in billions of dollars for each QSR firm under investigation. Numerous previous studies have attempted to assess the impact of advertising on market performance, particularly its effect on sales (Borden, 1942; Nelson, 1964; Bass, 1969; Lambin, 1976; Kwoka, 1993; Yasin, 1996; Thomas, 1999; Nelson, 2004; Fare, Grosskopf, Seldon and Tremblay, 2004; Tremnlay and Tremblay, 2005). In fact, several historical and current research has focused on the dynamic relationship between advertising expenditures and sales revenues (Helmer and Johansson, 1977; Caines et. al, 1977; Winer, 1979; Hanssens, 1980; Bhattacharyya, 1982; Heyse and Wei, 1985; Baghestani, 1991, and Zanias, 1994). Bagwell (2005) and Clark (1976) provide a detailed historical overview on such research. In this study, annual sales revenue is considered to be the most reliable continuous

measure of consumption available, and thus is selected as a measure for each QSR firm's market performance impact.

The data for sales revenue is obtained from the Technomic database. Technomic Inc. was founded in 1966 and is the premier food industry consulting and research firm in the United States. Technomic has several leading publications, newsletters, and other information resources on the U.S. food industry including: annual industry reports, consumer trend reports, industry forecasts and other food industry related data.

As noted earlier, it is important to control for price, inflation and population effects which prior research has shown to be associated with sales revenues (Schmalensee, 1972; Schumann, Hathcote and West, 1991; Bagwell, 2001). In this study, sales revenues are corrected by the CPI for FAFH to adjust for price and inflationary effects (Base 1982-1984=100). The use of constant dollar scale, as noted earlier in this manuscript, is a well-known technique to deal with intra-year currency value comparisons (Kyle, 1996).

Consumer Price Index, Food Away from Home (FAFH)

The CPI for Food Away from Home (FAFH) measures the average price paid for food items purchased away from home by an average U.S. consumer and compares it to the average price paid for the same items in an earlier base year. The CPI data series is collected from the US Bureau of Labor and Statistics (BLS). The CPI for FAFH gauges QSR menu price changes across the 22 years examined in this study. Thus, this study will

take into account the effects of price and inflation, allowing a comparison of dollar values from one year to another in terms of the real value of an income rather than a nominal value. It is important to note that the price variable used in this study (CPI FAFH) is a weighted average of actually paid prices in the observed period, and thus captures the price promotional effects within the market (Franses, 1991).

Population

Subsequently, following Franses (1991), sales revenues were divided by the total population to remove population effects on sales. In this way this study will also account for population effects while examining the relationship between advertising and sales in the QSR industry. All population data is obtained through the U.S. Bureau of Census database. Previous econometric studies of advertising have used a per capita measurement of the dependent variable. To do this, several studies have divided the dependent variable is divided by the total population in order to weight population effects on consumption (Bass, 1969; Rao, 1974; Franses, 1991; Franke and Wilcox, 1987).

Method of Data Analysis

The goal of this study is to provide a comprehensive analysis on the relationship between advertising expenditures and sales revenue in the QSR industry in the United States from 1986 to 2007. First, this study will consider the relationship between

aggregate advertising expenditures and aggregate sales for the QSR industry in the observed period. Second, this study will examine the relationship between advertising expenditures and sales revenues for each QSR firm in the observed period. In doing so this study employs the use of time-series analysis of longitudinal data over a 22 year period in the United States. This comprehensive analysis is addressed by selecting a subset of significant predictor variables affecting QSR consumption, i.e. sales revenues. Regression analysis is used in order to reach the final subset of predictor variables.

Time-series data are usually not well suited for an ordinary regression analysis as these data do not meet the assumption of the classical linear regression model. Namely, time-series data do not meet the assumption of independence, i.e. in time-series data the error term is not independent across time. Because of this, the error term is serially correlated or auto-correlated. In the later case, Ordinary Least Squares (OLS) procedure is not an effective means for analysis because the standard error estimates are biased. This implies several problems for ordinary regression analysis. For example, the tests of statistical significance of the parameters, and the confidence limits for the predicted values are not accurate. Furthermore, the estimated regression coefficients are not as efficient as when the data were not auto-correlated. The AUTOREG procedure in SAS solves this problem by accounting for the autocorrelation of the errors. That is, the SAS AUTOREG procedure uses a generalized least-squares approach which uses estimates of autocorrelation in the model's residuals while estimating structural parameters and

significance levels. So, AUTOREG will adjust for the autocorrelation in the annual data, thereby producing better estimates of the true regression parameters.

Time series analysis allows the data to specify the relationship as much as possible. That is to say, time series employs certain procedures which allow it to detect a wide variety of possible relationships, including the possibility of no relationship at all. In this way, it provides a mechanism for testing structural models of the advertising-sales relationships. Following the analysis procedures set forth by previous studies (Wilcox, 1994; Wilcox, 2001; Wilcox and Gangadharbatla, 2006; Wilcox, Gangaharbatla and Kamal, 2009), this study used a stepwise regression analysis with backwards elimination of non-significant predictors to determine which variables are significant predictors of the consumption series.

It is important to note that, due to the serious problems of autocorrelation which can be present in the analysis of time-series data, a generalized least-squares regression approach that uses estimates of autocorrelation in a model's residuals is used in estimating structural parameters and significance. The maximum-likelihood approach in the SAS AUTOREG procedure takes into account significant autocorrelations at lags of 1 and 2 years.

Data Analysis Procedure

This study aims to analyze the effect and relationship of advertising expenditures and sales revenue on the aggregate and brand level for a leading and heavily advertised industry within the United States, the QSR industry, over a period of 22 years (1986 to 2007). To do so two sets of analyses are conducted: 1) aggregate level and 2) brand level analysis. In this section, the procedure used to analyze these relationships is discussed in detail.

Aggregate Level Analysis

In the aggregate level analysis, the relationships between advertising expenditures and sales revenues are explored for the overall QSR industry. These regression equations aim to explicate the macro-level effect and relationship between aggregate advertising on total sales revenues. In addition, within this set of analyses the effect of advertising by types of media on total sales will also be examined. The following section provides the regression analysis procedure at the aggregate level in detail.

First, aggregate advertising expenditures and the other predictor variables are used in the regression equation with total sales revenues as the dependent variable. Next, the least significant predictor is dropped and another regression is preformed. This process of modeling continues till the final model with all significant variables is found

($p < .05$). Subsequently, the R-squares of the sequential models are compared to ensure no significant drop in explained variance.

Next, the relationship between advertising expenditures by media type (Electronic, Print and Outdoor) and sales revenues are examined. Following the aforementioned procedure, aggregate advertising expenditures for all electronic media (totals of advertising dollars spent on cable television, spot television, network television, syndicated television, online, spot radio, network radio, and so on) and the other predictor variables are used in the regression equation with total sales revenues as the dependent variable. Predictors with the least amount of significance are removed and another regression is preformed. The process of modeling is repeated until the final model is reached where all variables are significant, i.e. ($p < .05$). As indicated above, the R-squares corresponding to the sequential models are examined to make sure that there is no significant drop in explained variance.

This procedure is then replicated to examine the relationship between print advertising expenditures and total sales revenues. That is, all advertising expenditures for print media (including magazine, Sunday magazine advertising, newspaper advertising and newspaper supplement) and the other predictor variables are used in the regression equation with total sales revenues as the dependent variable. Subsequently, the least significant predictors are dropped and another regression will be preformed. The modeling process continues until the final model, with all significant variables, is found ($p < .05$). Again, the R-squares of the sequential models are compared to ensure that there was no significant drop in explained variance.

A fourth regression is preformed, to examine the relationship between outdoor advertising expenditures and sales revenues. To do this, total dollars spent on outdoor advertising along with other predictor variables are used in the regression equation, where total sales revenues are the dependent variable. Following the procedure mentioned above, the least significant predictor for sales are dropped from the regression and the regression is preformed once again. This process will continue until the final model with all significant variables ($p < .05$) is reached. As indicated above, the R-squares of the sequential models are compared to avoid a significant drop in explained variance.

Brand Level Analysis

This set of analyses examines the relationship between advertising expenditures and sales revenues at the brand level. The aim of the following regressions is to analyze the effect and relationship between advertising expenditures on sales revenues at the individual brand level. By doing so, these analyses offer an in-depth understanding of the effect of advertising on sales and its relationship by brand. The effect of advertising by media type on brand sales is explored in detail. The following section provides a comprehensive explanation of the procedure of analysis at the brand level. Following the data analysis procedure detailed in the preceding section, a subset of regression models was established at the individual brand level. The following modeling procedure was replicated for each brand examined in the current study, namely: Dominos, Jack-In-the-Box, KFC, McDonald’s, Pizza Hut, Sonic, Taco Bell, and Wendy's.

The next series of regression equations explores the advertising expenditure variable by media type i.e. electronic, print and outdoor and its relationship with the total sales revenues generated by brand. Similar to the procedure followed for aggregate level analysis, three regression equations are established for each media type. First, total brand advertising expenditures for electronic media and the other predictor variables are used in the regression equation with total brand sales revenues as the dependent variable. Predictors with the least amount of significance will be removed and another regression will be preformed. The process of modeling is repeated until the final model is reached where all variables are significant, i.e. ($p < .05$). As indicated above, the R-squares corresponding to the sequential models is examined to make sure that there was no significant drop in explained variance.

This procedure was followed to examine the relationship between brand print advertising expenditures and total brand sales revenues. Specifically, brand expenditures for print media advertising and the other predictor variables are used in the regression equation with total brand sales revenues as the dependent variable. Predictors with the least level of significance are dropped from the equation and another regression is preformed. The modeling process continued until a final model is reached, with all variables significant ($p < .05$). The sequential model's R-squares are compared to see if there is any decrease in explained variance.

A final regression is conducted to analyze the effect of brand outdoor advertising expenditures on sales revenues. That is, the total brand expenditures for outdoor advertising along with other predictor variables are used in the regression equation with

total brand sales revenues as the dependent variable. The modeling procedure detailed above was followed to reach the final model with all significant variables ($p < .05$). Once again, the R-squares of the sequential models are examined to check for any significant drop in explained variance.

Summary

The sample and database was collected from a variety of sources, namely: Leading National Advertisers (LNA), Inc. databases, Nielsen Monitor Plus®, US Bureau of Labor and Statistics (BLS), US Bureau of Census, Technomic, Inc., and McCann-Erickson. Nine leading QSR firms were selected: McDonald's, Wendy's, Taco Bell, KFC, Pizza Hut, Sonic, Domino's, and Jack-In-the-Box. Firms included in the study were selected on the basis of their overall market sales rank, industrial category code, and description. Aggregate advertising expenditures, electronic advertising expenditures, print advertising expenditures, outdoor advertising expenditures, and annual expenditures for Food Away from Home (FAFH) were the independent variables of the study, while sales revenue per capita was the dependent variable. Appropriate measures were taken to correct for the effects of price and inflation on sales revenues. Additionally, all dollar unit variables were converted to constant dollar scale (Base 1982-1984=100) to ensure a constant and accurate comparison of amounts.

The chapter presented a detailed overview of the advertising variables collected for the study. In order to test the hypotheses, regression analysis was used; the data procedure was explained at length.

Table 5: Summary of Research Hypotheses

H1	Aggregate advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.
H2	Advertising expenditures by each media type will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.
H2a	Aggregate electronic advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.
H2b	Aggregate print advertising expenditures will have a significant and positive effect relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.
H2c	Aggregate outdoor advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.
H3	Brand advertising expenditures by media will have a positive and significant relationship with sales revenues for the QSR firm sales in the United States from 1986 to 2007.
H3a	Brand electronic advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.
H3b	Brand print advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.
H3c	Brand outdoor advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.

Table 5 summarized the hypotheses stated in the previous chapter. These hypotheses will be tested in Chapter 5. In the following chapter each of the above-mentioned hypotheses are tested and the study findings will be presented.

CHAPTER 5

RESULTS

Introduction

In this chapter, the research hypotheses are tested. The three research hypotheses tested in this chapter can be divided into two sets of analysis. The first set of analyses test the research hypotheses that pertain to aggregate level data. That is, the results from these tests provide an understanding of the relationship between advertising and sales at an industry aggregate level. Specifically, the two hypotheses tested in this set of analyses are: (1) the positive relationship between aggregate advertising expenditures and aggregate sales revenues; (2) the positive relationship between aggregate advertising expenditures by media type (electronic, print and outdoor) and aggregate sales revenues. The second set of research hypotheses test the relationship between advertising and sales at the brand level. More precisely, the hypothesis tested in this set is: (1) the positive relationship between brand advertising expenditures by media type (electronic, print and outdoor) and brand sales revenues. Prior to hypothesis testing, results from a few descriptive tests are presented. Then, the results of regression analysis corresponding to each research hypothesis are provided. Next, the results of additional analysis are discussed in an effort to further bolster the study's findings.

The goal of this study is to provide a comprehensive analysis on the relationship between advertising expenditures and sales revenue for the QSR industry and nine

leading companies in the QSR industry. In doing so this study employs the use of time-series analysis of longitudinal data over a 22 year period in the United States. This comprehensive analysis is addressed by selecting a subset of significant predictor variables affecting QSR consumption i.e. sales revenues. Regression analysis is used in order to reach the final subset of predictor variables.

Time-series data are usually not well suited for ordinary regression analysis as these data do not meet the assumption of the classical linear regression model. Namely, time-series data do not meet the assumption of independence i.e. in time-series data the error term is not independent across time. Because of this, the error term is serially correlated or auto-correlated. In the later case, Ordinary Least Squares (OLS) procedure is not an effective means for analysis because the standard error estimates are biased. This implies several problems for ordinary regression analysis. For example, the tests of statistical significance of the parameters, and the confidence limits for the predicted values are not accurate. Furthermore, the estimate of the regression coefficients is not as efficient as when the data were not auto-correlated. The AUTOREG procedure in SAS provides a solution to this problem by accounting for the autocorrelation of the errors. That is, the SAS AUTOREG procedure augments the regression model with an autoregressive model for the random error. AUTOREG procedure employs a generalized least-squares approach which uses estimates of autocorrelation in the model's residuals while estimating structural parameters and significance levels. So, AUTOREG will adjust for the autocorrelation in the annual data, thereby producing better estimates of the true

regression parameters. The estimates produced by AUTOREG are better estimates of the true regression parameters. Specifically, the AUTOREG procedure assumes that the error term is autoregressive with a given ρ for the parameter estimation. The parameter estimates are similar to least squares estimated but the standard error may be different, which in turn affects significance. By simultaneously estimating the regression coefficients β and autoregressive error model parameters ρ, the AUTOREG procedure corrects the regression estimates for autocorrelations. The maximum-likelihood approach in the SAS AUTOREG procedure (SAS Institute, 2008) was used to analyze annual data, taking into account any significant correlation at lags of one and two years. As discussed in the Literature Review, numerous studies demonstrate carry-over effects of advertising, suggesting a "lagged" effect of advertising on sales (Hollander, 1949; Dean 1951; Jastram 1955; Vidale and Wolfe 1957; Nerlove and Waugh 1961). In his exhaustive review of empirical research, Clarke (1976, p.355) finds that a lagged effect of advertising on sales exists but the "duration of cumulative advertising effect on sales is between 3 and 15 months; thus this effect is short term (about a year or less) phenomenon". Additionally, results from various studies such as Ashely et. al (1980), Boyd and Seldon (1990), Sheldon and Doroodian (1989); and Leone (1995) provide further evidence in support of these finding that advertising effects on sales largely dissipate in a year.

First, the data were entered, cleaned and imported in SAS 8.0. A stepwise regression analysis with backwards elimination of non-significant predicators was used to

test the hypotheses. Prior to hypothesis testing, the data was examined to ensure that no violations to the assumptions of ordinary least squares (OLS) were present in the current data. Next, a few descriptive tests were performed on the data. The following section provides the results of the tests and descriptive analysis conducted on the current data.

Testing for Autocorrelations

Regression analysis that employs the use of time series data, faces the problem of autocorrelation of the residuals or "error terms". As mentioned earlier in the methodology section, autocorrelation violates the ordinary least squares (OLS) assumption that the error terms are uncorrelated. Although this does not bias the OLS coefficient estimates, when the autocorrelations of the errors are positive for lags of short periods (such as quarters, months, and so on) the standard errors are underestimated and the t-scores tend to be overestimated. To account for this a Durbin-Watson test was performed to check for the presence of autocorrelations in the data (H_0: there is no positive or negative autocorrelation.)

In all nine cases, the Durbin-Watson test statistic was significant with $p < .05$ for the null hypothesis including that no autocorrelation is present for the current data. Thus, this suggests that ordinary general regression is not suitable for testing this data. The AUTOREG procedure in SAS software solves for this problem by augmenting the regression model with an autoregressive model for the random error, thereby accounting

for the autocorrelation of the errors. Using a generalized least-square regression approach the SAS AUTOREG procedure uses the estimates of autocorrelation in the model's residuals in estimating the structural parameters and significance levels. Results from the Durbin-Watson test for each QSR firm are shown below in Table 6.

Table 6: Durbin-Watson Test for Autocorrelation

	QSR Firm	**Durbin-Watson**
Dependant Variable= **Sales Revenues**	Domino's	1.3007
	Jack-in-the-Box	1.5739
	KFC	1.7158
	McDonald's	1.3902
	PizzaHut	1.0777
	Sonic	0.6566
	Subway	0.9775
	TacoBell	0.8060
	Wendy's	1.0011
significant at $p < .05$		

Testing for Heteroscedasticity

The assumption of homoscedasticity, also known as homogeneity of variance, is an important assumption of the ordinary regression model. Homoscedasticity in regression analysis is the condition of constant variance, that is, the error terms have the same variance throughout the sample. If this assumption is not met, and the error variance is not the same throughout the data, then the data shows heteroscedasticity.

Heteroscedasticity does not cause OLS coefficient estimates to be biased. However, the variance and standard errors of the coefficients tends to be underestimated, inflating t-scores. Therefore, models that can account for changing variance can more

efficiently test such data. Using the AUTOREG procedure in SAS the presence of heteroscedasticity in the data was evaluated by examining the OLS residuals. Statistics provided by AUTOREG suggest that heteroscedasticity is not present in the current data.

Descriptive Analysis

For the descriptive analyses, the time-series data was dealt with as cross-sectional data. A total of 198 firm-year observations for nine companies, had complete data on sales revenues, total advertising expenditures for the observed period of 22 years, with no missing observations. Prior to hypotheses testing, descriptive analyses are conducted to test the implicit argument of the current study—firms with higher levels of advertising will generate higher sales revenues. In the descriptive analysis, the effect of advertising in the process of creating a firm's value is measured in two ways, absolute advertising expenditures and advertising intensity.

The relationship between advertising expenditures and sales revenues may be different for the two measures of advertising. Absolute advertising expenditure encompasses the total advertising expenditures of year t. While, advertising intensity is measured as the ratio between advertising expenditures to total sales for each firm-year observation (advertising expenditure/sales). Next, using median splits the total advertising expenditure and advertising intensity is recorded into two categories. Specifically, these variables were divided into two categories based on their median value

of advertising expenditures and advertising intensity: low advertising vs. high advertising and low advertising intensity vs. high advertising intensity.

Advertising Expenditures and Sales

QSR firms with higher advertising expenditures generated higher sales revenues than firms than those firms that had lower advertising expenditures. The difference is statistically significant (firms with high advertising expenditures, mean= 222.39, S.D.= 214.80; firms with lower advertising expenditures mean= 69.29, S.D.= 50.93, t= -6.90, p= < 0.005)

Advertising Intensity and Sales

As seen in the above advertising expenditures and sales relationship, firms spending more on advertising had higher sales revenues than those firms that had lower advertising expenditures.

Advertising intensity (a firm's total advertising expenditure/ a firm's total sales) gauges the ratio between advertising expenses incurred and sales earned for each firm. A statistically significant relationship was found between those firms that spend a high amount of their money on advertising in proportion to their sales, and those firms that spend less amount of their money on advertising in proportion to their sales (firms with high advertising intensity, mean=137.89; S.D. = 176.98; firms with low advertising

intensity, mean=153.95, S.D. =170.89, t= 6.50). This indicates that those firms that allocate a higher proportion of their revenues towards advertising may have higher sales than those companies that spend less on advertising expenditures in proportion to their sales.

That is, when absolute sales revenues is controlled for, the positive relationship between advertising expenditures and sales revenues is still found to be present.

Hypotheses Test

In the following section, each hypothesis is presented with the corresponding regression model. Next, the full and final models of each hypothesis are put forth in Table 7 and Table 8. The results pertaining to aggregate level and brand level hypotheses are discussed in detail. Because the interpretation focuses on the final models with the non-significant predictors dropped, the full models with all predictors are not discussed. In addition the intercept parameters have no substantive relevance to understand the advertising-sales relationship and thus are ignored in the discussion.

Aggregate Level Analysis

Aggregate Advertising Expenditures and Sales Revenues (Hypothesis 1)

H1: Aggregate advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

This study considered the impact of aggregate advertising expenditures, annual expenditures for food away from home and sales revenues for the category of QSR firms. In exploring this relationship, two relevant factors affecting consumption that were exogenous to marketing communications were also taken into account: (1) price and inflationary effects on sales; and (2) population effects on sales. Aggregate sales for the category of QSR firms were divided by the total population to arrive at the per capita sales revenues. In doing so this study accounts for the changes in population on the dependent variable side of the equation.

In fact, past econometric studies of advertising have also defined the dependent variable as per capita. That is in many leading studies the dependent variable is divided by the total population to weight population effects on consumption. For, example Bass (1969) uses simultaneous equation regression methods to analyze time series data for sales and advertising for filter and non- filter cigarette brands in the United States from 1953 to 1965. The author uses per capita measure of sales by dividing the sales of filter cigarettes by the total population over 20 in the United States. In another study, Rao (1974) uses different econometric models to describe the advertising-sales relationships for six major cigarette companies in the United States: R. J. Reynolds, American Tobacco, Liggett and

Myers, P. Lorillard, Philip Morris, and Brown and Williamson from for 1945 to 1965. In the first model, the author uses per capita sales as the dependent variable to examine the effect of advertising on per capita sales from 1945 to 1965 for the six leading companies. Similarly, in a study analyzing the relationship between industry wide advertising expenditures and Per capita consumption of beer, wine, and distilled spirits in the United States from 1964-1984. Franke and Wilcox (1987) use per capita consumption of gallons of alcohol consumed. Specifically, for the three alcoholic beverage consumption variables (beer, wine, and distilled spirits), the total consumption of the beverages in gallons is divided by the number of adults aged 21 and older to obtain per-capita consumption figures. In a later study, examining the effect of advertising on the consumption of beer in the Netherlands, Franses (1991) uses per capita consumption of beer by dividing the total liters of beer consumed divided by the population age over 15.

Second, to control for price this study used the CPI for Food Away from Home (FAFH) to adjust sales revenues for price and inflationary effects (Base 1982-1984=100). The CPI for FAFH measures the average price paid for food items purchased away from home by an average U.S. consumer and compares it to an earlier base year. As the CPI for FAFH is a weighted average of actually paid prices, it captures the price promotional effects within the market (Franses, 1991). Because no reliable and consistent record of QSR prices exists, the CPI for FAFH is the best measure of price to date. Previous research has also used CPI as a proxy measure for price. For example, in a similar study about cigarette consumption and advertising, Bass (1969, p.293) states that “although it

might have been desirable to include prices of the filter and non-filter cigarettes as variables, the non-filter price is available as a component of the consumer price index".

To examine the relationship between aggregate advertising expenditures and per capita sales revenues, the following model is used:

$$SR_{it} = \beta_0 + \beta_1 X_{1it-1} + \beta_2 X_{2t} + e_{it}$$

where:

$X_{1\,it-1}$ = advertising expenditures in year t-1;

X_{2t} = food away from home expenditures in year t;

SR_t = per capita sales revenues in year t;

$e_t = \rho e_{t-1} + v_{it}$ ($|\rho| < 1$, e_t is the error term, and v_t is a random variable with a zero mean, constant variance, and zero correlation with the other errors).

The first research hypothesis examined the relationship between aggregate advertising and sales revenues for the category of QSR firms. A regression analysis was preformed with advertising variable and annual expenditures for FAFH as the independent variables and per capita sales revenues as the dependent variable. The full/final regression model is presented in Table 7.

Table 7: Full/Final consumption— Aggregate advertising model

Predictor	Df	b value	t ratio	p-level
Intercept	1	-4311	-8.76	<.0001
Aggregate Advertising	1	1.092E-6	2.51	0.0215
FAFH Annual Expenditures	1	0.0264	10.99	<.0001
Total RSQ= 0.9953; DFE= 19 Durbin-Watson = 1.3206				

Taking into account significant autocorrelations at one and two years, aggregate advertising expenditures and annual expenditures for food away from home (FAFH) exhibited a significant and positive relationship with per capita sales revenues for the category of QSR firms. Thus, the study results provide support for Hypothesis 1: advertising has a positive and significant influence on sales revenues for the category of QSR firms, (t=2.51, p= .0215). Additionally, annual expenditures for FAFH have a positive and significant relationship with sales revenues for the category of QSR firms, (t=10.99, p= <.0001).

It is important to note that although aggregate advertising expenditures is significantly related to QSR sales revenues, the coefficient values are small and thus have a lesser impact on sales revenues. As seen in Table 1 advertising has a point of estimate of 1.092E-6, which means a 1 percent increase in advertising of QSR is associated with an increase in the per capita sales revenues of QSR by 1.092E-6 percent.

Aggregate Advertising Expenditures by Media Type and Sales Revenues (Hypothesis 2)

H2 Advertising expenditures by each media type will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

H2a Aggregate electronic advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

H2b Aggregate print advertising expenditures will have a significant and positive effect relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

H2c Aggregate outdoor advertising expenditures will have a significant and positive relationship with aggregate per capita sales in the QSR industry in the United States from 1986 to 2007.

The second research hypothesis examined the advertising variable in more detail. That is, the total advertising expenditures variable was broken down into three categories: (1) electronic advertising; (2) print advertising; and, (3) outdoor advertising. These three new variables combined with annual expenditures for FAFH was regressed on per capita sales revenues as the dependent variable. Once again, the least significant predictors of QSR sales revenues were dropped and another regression analysis was preformed. The analysis continued until the final model was found with all significant variables ($p < .05$).

To examine the relationship between advertising expenditures by media type and per capita sales revenues, the following model is used:

$$SR_t = \beta_0 + \beta_1 X_{2t} + \beta_2 X_{3t-1} + \beta_3 X_{4t-1} + \beta_4 X_{5t-1} + e_t$$

where:

X_{2t} = food away from home expenditures in year t; X_{3t-1} = electronic advertising expenditures in year t-1; X_{4t-1} = print advertising expenditures in year t-1;

X_{5t-1} = billboard advertising expenditures in year t-1;

SR_t = per capita sales revenues in year t;

$e_t = \rho e_{t-1} + v_{it}$ ($|\rho| < 1$, e_t is the error term, and v_t is a random variable with a zero mean, constant variance, and zero correlation with the other errors).

The full regression model using electronic, print and outdoor advertising expenditures is presented in Table 8. The final model is shown in Table 9.

Table 8: Full consumption— Advertising by Media type model

Predictor	Df	b value	t ratio	p-level
Intercept	1	-4555	-8.29	<.0001
Electronic Advertising	1	4.3941E-7	0.73	0.4781
Print Advertising	1	5.8451E-6	0.70	0.4905
Outdoor Advertising	1	0.000111	0.93	0.3632
FAFH Annual Expenditures	1	0.0277	9.98	<.0001
Total RSQ= 0.9962; DFE= 17 Durbin-Watson = 1.3634				

Table 9: Final consumption— Advertising by Media type model

Predictor	df	b value	t ratio	p-level
Intercept	1	-4986	-8.29	<.0001
Outdoor Advertising	1	0.000218	2.89	0.0093
FAFH Annual Expenditures	1	0.0297	30.04	<.0001
Total RSQ= 0.9957; DFE= 19 Durbin-Watson = 1.3898				

Taking into account significant autocorrelations at one and two years, outdoor advertising expenditures exhibited a significant positive relationship with per capita sales revenues (t=2.89, p= 0.0093). Similarly, annual expenditures for food away from home (FAFH) showed a significant positive relationship with per capita sales revenues (t=30.04, p= <0.0001). Hypotheses 2a and 2b were not supported.

However, it is important to note that although outdoor advertising is significantly related to QSR sales revenues, the coefficient values are small and may have minimal impact on consumption. For example, outdoor advertising has a point of estimate of 0.000218, which means a 1 percent increase in outdoor advertising of QSR is associated with an increase in the per capita sales revenues of QSR by 0.000218 percent.

Brand Level Analysis

Brand Advertising Expenditures by media and Sales Revenues (Hypothesis 3)

H3 Brand advertising expenditures by media will have a positive and significant relationship with sales revenues for the QSR firm sales in the United States from 1986 to 2007.

H3a Brand electronic advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.

H3b Brand print advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.

H3c Brand outdoor advertising expenditures will have a significant and positive relationship with brand per capita sales in the QSR industry in the United States from 1986 to 2007.

In this set of analyses, a regression was run to examine the relationship between brand advertising expenditures by media and sales. For each QSR firm, electronic advertising expenditures, print advertising expenditures and outdoor advertising expenditures were regressed on sales as the dependent variable. Then, the least significant variable was dropped ($p < .05$) and another regression analysis was performed. This procedure continued until all independent variables were significant in the regression model. Finally, the R squares of the sequential models were compared to see if there was a significant drop in explained variance. The full regression model is presented in Table 4. The final model is shown in Table 5.

To examine the relationship between brand advertising expenditures by media type and brand sales revenues, the following model is used:

$$SR_t = \beta_0 + \beta_1 X_{2t} + \beta_2 X_{3t-1} + \beta_3 X_{4t-1} + \beta_4 X_{5t-1} + e_t$$

where:

X_{2t} = food away from home expenditures year t;

X_{3t-1} = brand electronic advertising expenditures in year t-1;

X_{4t} = brand print advertising expenditures in year t-1;

X_{5t} = brand billboard advertising expenditures in year t-1;

SR_t = brand sales revenues in year t;

$e_t = \rho e_{t-1} + v_{it}$ ($|\rho| < 1$, e_t is the error term, and v_t is a random variable with a zero mean, constant variance, and zero correlation with the other errors).

As mentioned earlier in the methodology section, the current study considered the impact of the firm's advertising by media type (electronic, print and outdoor) in Period t-1 on sales in Period t, in accordance with the time lags suggested by previous studies (McGuire, Sundgren, and Schneeweis, 1988; Fombrun and Shanley, 1990; Wilcox, 2001; Franke and Wilcox,1994; Wilcox et. al, 2009).

For each QSR firm, the full regression models with all variables are presented in Table 10. Table 11 provides the final models for each company. As the current study focuses on the final models, in which the non-significant variables are dropped, the full models with all predictors will not be discussed. The interpretation was made for the final model. Additionally, since the intercept parameters do not provide any substantial

relevance to understanding the relationship between advertising and sales in among leading QSR firm, they are not discussed.

Five QSR firms were (McDonald's. Wendy's, Sonic, Jack-in-the-Box, and Subway) showed a positive and significant relationship between electronic advertising expenditures and sales. Print advertising expenditures exhibited a significant relationship on sales for three QSR firms. In three QSR firms (Wendy's, Jack-in-the-Box, and Domino's) print advertising expenditures was positively associated with sales revenues. While outdoor advertising expenditures showed a significant relationship with brand sales for four QSR firms. For McDonald's, Wendy's and Domino's out for advertising expenditures showed a significant and positive effect on sales revenues. However, Jack-in-the-Box exhibited a negative and significant relationship between outdoor advertising expenditures and sales revenues. FAFH exhibited a positive and significant relationship with sales for all nine QSR firms.

The individual final models for each QSR firm indicated that in seven models (Wendy's, KFC, Domino's, Subway, Sonic, PizzaHut, Jack-in-the-Box) the predicators explained over 90 percent of the variance in brand sales, and over 80 percent in the remaining two QSR companies (McDonald's, and TacoBell).

Table 10: Full consumption— Advertising and sales models (In Alphabetical order)

	Df	b value	t ratio	p-level
Dominos				
Intercept	1	562261	1.40	0.1798
Electronic Advertising	1	0.003987	0.82	0.4216
Print Advertising	1	0.9938	2.44	0.0261
Outdoor Advertising	1	-4.6979	-2.60	0.0185
FAFH Annual Expenditures	1	7.5604	4.80	0.0002
Total RSQ= 0.9205; DFE= 17; Durbin-Watson = 1.3565				
Jack-In-the-Box				
Intercept	1	-1323145	-3.06	0.0071
Electronic Advertising	1	9.1173	4.48	0.0003
Print Advertising	1	1.4401	3.43	0.0032
Outdoor Advertising	1	-0.8044	-2.15	0.0462
FAFH Annual Expenditures	1	9.1173	4.48	0.0003
Total RSQ= 0.9901; DFE= 17 Durbin-Watson = 1.5739				
KFC				
Intercept	1	-1342264	-1.80	0.0891
Electronic Advertising	1	0.009495	1.52	0.1462
Print Advertising	1	-0.2967	-0.77	0.4493
Outdoor Advertising	1	-1.0646	-2.46	0.0251
FAFH Annual Expenditures	1	20.0244	5.44	<.0001
Total RSQ= 0.9795; DFE= 17 Durbin-Watson = 1.7158				
McDonald's				
Intercept	1	0.8174	12.30	<.0001
Electronic Advertising	1	6.525E-10	3.07	0.0069
Print Advertising	1	2.6777E-9	1.23	0.2337
Outdoor Advertising	1	4.5471E-9	1.78	0.0930
FAFH Annual Expenditures	1	-1.942E-6	-5.60	<.0001
Total RSQ= 0.8345; DFE= 17 Durbin-Watson = 1.4482				
Pizza Hut				

Intercept	1	-774831	-0.33	0.7433
Electronic Advertising	1	-0. .004239	-0.33	0.7439
Print Advertising	1	1.3242	1.21	0.2427
Outdoor Advertising	1	1.7054	1.38	0.1851
FAFH Annual Expenditures	1	17.6789	1.96	0.0677
Total RSQ= 0.9522; DFE= 16 Durbin-Watson = 1.0026				
Sonic				
Intercept	1	-3066795	-9.32	<.0001
Electronic Advertising	1	0.0341	4.95	0.0001
Print Advertising	1	0.6538	0.93	0.3671
Outdoor Advertising	1	0.3972	0.46	0.6516
FAFH Annual Expenditures	1	15.9531	11.29	<.0001
Total RSQ= 0.9935; DFE= 17 Durbin-Watson = 0.7828				
Subway				
Intercept	1	562261	1.40	0.1798
Electronic Advertising	1	0.0229	3.44	0.0031
Print Advertising	1	-0.005872	-0.05	0.9611
Outdoor Advertising	1	0.6126	1.81	0.0887
FAFH Annual Expenditures	1	38.7602	8.95	<.0001
Total RSQ= 0.9941; DFE= 17; Durbin-Watson = 1.2280				
Taco Bell				
Intercept	1	0.0275	0.32	0.7525
Electronic Advertising	1	3.016E-10	0.40	0.6923
Print Advertising	1	-1.563E-8	-0.89	0.3861
Outdoor Advertising	1	-2.675E-8	-1.02	0.3213
FAFH Annual Expenditures	1	2.5142E-7	0.60	0.5582
Total RSQ= 0.3199; DFE= 17 Durbin-Watson = 0.3704				
Wendy's				
Intercept	1	-3096955	-2.45	0.0253
Electronic Advertising	1	0.0365	3.41	0.0033
Print Advertising	1	0.0803	2.31	0.0340

Outdoor Advertising	1	-0.5498	-2.28	0.0358
FAFH Annual Expenditures	1	26.0832	4.20	0.0006
Total RSQ= 0.8336; DFE= 17 Durbin-Watson = 1.2567				

Table 11: Final consumption— Advertising and Sales model

Dominos				
Intercept	1	406982	1.16	0.2624
Print Advertising	1	1.1248	3.02	0.0073
Outdoor Advertising	1	-4.1909	-2.49	0.0226
FAFH	1	8.2142	6.09	<.0001
Total RSQ= 0.9174; DFE= 18 Durbin-Watson = 1.3007				
Jack-In-the-Box				
Intercept	1	-1323145	-3.06	0.0071
Electronic Advertising	1	9.1173	4.48	0.0003
Print Advertising	1	1.4401	3.43	0.0032
Outdoor Advertising	1	-0.8044	-2.15	0.0462
FAFH Annual Expenditures	1	9.1173	4.48	0.0003
Total RSQ= 0.9901; DFE= 17 Durbin-Watson = 1.5739				
KFC				
Intercept	1	-1821184	-7.85	<.0001
FAFH Annual Expenditures	1	22.2981	25.24	<.0001
Total RSQ= 0.9696; DFE= 20 Durbin-Watson = 1.7158				
McDonald's				
Intercept	1	0.8282	12.39	<.0001
Electronic Advertising		7.005E-10	3.31	0.0039
Outdoor Advertising	1	7.2224E-9	5.26	<.0001
FAFH Annual Expenditures	1	-2.013E-6	-5.80	<.0001
Total RSQ= 0.8196; DFE= 18 Durbin-Watson = 1.3902				
Pizza Hut				
Intercept	1	-775178	-0.37	0.7132
FAFH Annual Expenditures	1	18.2355	2.34	0.0306
Total RSQ= 0.9406; DFE= 19 Durbin-Watson = 1.0777				
Sonic				
Intercept	1	-3104829	-9.83	<.0001
Electronic Advertising	1	0.0374	9.14	<.0001

FAFH Annual Expenditures	1	16.1153	11.88	<.0001
Total RSQ= 0.9932; DFE= 19 Durbin-Watson = 0.6566				
Subway				
Intercept	1	-6906762	-7.31	<.0001
Electronic Advertising	1	0.0323	6.84	<.0001
FAFH	1	35.5579	8.54	<.0001
Total RSQ= 0.9928; DFE= 19 Durbin-Watson = 0.9775				
Taco Bell				
Intercept	1	0.0736	5.09	<.0001
FAFH Annual Expenditures	1	2.338E-10	1.14	0.2684
Total RSQ= 0.8982; DFE= 19 Durbin-Watson = 0.8060				
Wendy's				
Intercept	1	14.8514	1.44	0.1663
Electronic Advertising	1	-3.152E-7	-4.48	0.0003
FAFH Annual Expenditures	1	0.000613	12.39	<.0001
Total RSQ= 0.9829; DFE= 19 Durbin-Watson = 1.0011				

Additional Analysis

The issue of how to determine the effect of advertising on sales has long captured the attention of researchers in advertising and marketing domains. As a result, a voluminous literature exists where numerous attempts have been made to establish econometric models for the advertising and sales relationship utilizing time series data, including several important and classical studies (Bass, 1969; Borden, 1952, and Telser, 1962). While many measures of advertising effectiveness exist, such as awareness, attitude, recall, simulated purchase and so on, some argue that actual sales incurred is the ideal measure for the effectiveness of advertising (Rao, 1972, Robinson, Dalbey, Gross and Wind, 1968).

One way to classify the models found in the literature is to examine the way in which the variables have been defined and operationalized e.g. actual sales and advertising expenditures versus marketing and advertising shares. Because there is a lack of solid theoretical understanding on how advertising actually works, many authors have described a difficulty in selecting the way in which to express the advertising-sales relationship and the definition of related variables. Bearing this in mind, the current study attempts to test different econometric models describing the advertising-sales relationship using two popular methods. First, analysis was done using market share as the dependant variable for econometric analyses. Second, a Chow test (Chow, 1960) was also conducted on the aggregate and brand level models presented in the results section above in order to test for the presence of structural breaks in data set. The results of the Chow test are

detailed in the following section. In addition, a relatively new type of modeling known as persistence modeling has also applied to the current data. The results for each of these analyses are presented below.

Market share Analysis

Brand Advertising Expenditures by media and Brand market share (Hypothesis 4)

H4 Brand advertising expenditures by media will have a positive and significant relationship with brand marketshare the QSR firm sales in the United States from 1986 to 2007.

H4a Brand electronic advertising expenditures will have a significant and positive relationship with brand marketshare in the QSR industry in the United States from 1986 to 2007.

H4b Brand print advertising expenditures will have a significant and positive relationship with brand marketshare in the QSR industry in the United States from 1986 to 2007.

H4c Brand outdoor advertising expenditures will have a significant and positive relationship with brand marketshare in the QSR industry in the United States from 1986 to 2007.

In this set of analyses, a regression was run to examine the relationship between brand advertising expenditure by media and market share. For each QSR firm, electronic advertising expenditures, print advertising expenditures and outdoor advertising expenditures were regressed on market share as the dependent variable. Then, the least significant variable was dropped ($p < .05$) and another regression analysis was performed. This procedure continued until all independent variables were significant in the regression model. Finally, the R squares of the sequential models were compared to see if there was a significant drop in explained variance.

To examine the relationship between brand advertising expenditures by media type and brand market share, the following model is used:

$$MKTSHR_t = \beta_0 + \beta_1 X_{2t} + \beta_2 X_{3t-1} + \beta_3 X_{4t-1} + \beta_4 X_{5t-1} + e_t$$

where:

X_{2t} = food away from home expenditures year t;

X_{3t-1} = brand electronic advertising expenditures in year t-1;

X_{4t} = brand print advertising expenditures in year t-1;

X_{5t} = brand billboard advertising expenditures in year t-1;

MKTSHR_t = brand market share in year t;

$e_t = \rho e_{t-1} + v_{it}$ ($|\rho| < 1$, e_t is the error term, and v_t is a random variable with a zero mean, constant variance, and zero correlation with the other errors).

Because no econometric analysis of QSR firm advertising and consumption exists to date, findings from related disposable consumer products such as soft drinks, alcoholic beverages and cigarettes have been used to provide an important segue into understanding the relationship between advertising and consumption in the QSR industry. Several previous studies suggest that advertising is aimed at achieving brand loyalty and brand switching among existing users (Boddewyn, 1989; Kozlowski, 1989; Wilcox, 1991, 2001, Wilcox, Gangadharbatla, and Kamal, 2009). That is, advertising effects the selective demand for a product but seldom impacts the total market or primary demand. For example in a comprehensive study about alcohol consumption Fisher and Cook (1995) find that consumers who choose to drink alcohol, often selectively switch between

product categories and brands to satisfy their consumption needs and advertising may influence that choice. Similar findings have been found by Nelson and Moran (1995) and Wilcox (1991, 2001). In light of the previous economic analyses, it is likely that QSR firm advertising will also impact the market share among the rival companies. Thus, this study hypothesizes that advertising will have a positive and significant impact on market share for each QSR firm.

A stepwise regression analysis with backwards elimination of non-significant predictors was run using the statistical software SAS to determine which variables were significant predictors of the consumption series. First, the advertising variables for each QSR firm (electronic, print and outdoor value of adjusted advertising spending) and annual expenditures for food away from home were used in an ordinary least-squares regression equation with each QSR firm market share the dependent variable (see Table 12). The least significant predictors were dropped and another regression analysis was performed. The analysis continued until a final model was found with all variables significant ($p < .05$) (See Table 13). Finally, the R squares of sequential models were compared to ensure that there was not a significant drop in explained variance. Only the final models with all significant variables will be discussed. Also, as the intercept parameters do not provide any substantial relevance to understanding the relationship between advertising and market share they are also removed from discussion.

Six QSR firms showed a significant relationship between electronic advertising expenditures and sales. Five of these firms (McDonald's. Wendy's, Sonic, Jack-in-the-

Box, and KFC) exhibited a positive and significant relationship between electronic advertising expenditures and market share. While one QSR firm, Pizza Hut showed a significant but negative relationship between electronic advertising expenditures and market share. Print advertising expenditures exhibited a significant and positive effect on market share for only one QSR firm (Jack-in-the-Box). While, outdoor advertising expenditures showed a significant relationship with brand market share for four QSR firms. For McDonald's, Jack-in-the-Box and KFC outdoor advertising expenditures showed a significant and positive effect on market shares for each respective brand. However, Wendy's showed a significant and negative relationship between outdoor advertising expenditures and market share.

The individual final models for each QSR firm indicated that in five models (KFC, Subway, Sonic, Pizza Hut, TacoBell) the predicators explained over 90 percent of the variance in brand sales, and over 80 percent in the remaining four QSR companies (Domino's, Jack-in-the-Box, McDonald's and Wendy's).

Table 12: Full consumption— Advertising and Market share model

	Df	b value	t ratio	p-level
Dominos				
Intercept	1	0.1770	9.23	<.0001
Electronic Advertising	1	1.618E-10	0.70	0.4930
Print Advertising	1	3.6991E-8	1.90	0.0742
Outdoor Advertising	1	-1.516E-7	-1.76	0.0960
FAFH Annual Expenditures	1	-4.495E-7	-5.98	<.0001
Total RSQ= 0.7870; DFE= 17 Durbin-Watson = 0.7945				
Jack-In-the-Box				
Intercept	1	0.0266	2.43	0.0263
Electronic Advertising	1	6.242E-10	2.95	0.0090
Print Advertising	1	2.2848E-8	2.16	0.0454
Outdoor Advertising	1	-2.737E-8	-2.90	0.0099
FAFH Annual Expenditures	1	5.4281E-9	0.11	0.9170
Total RSQ= 0.8740; DFE= 17 Durbin-Watson = 1.3246				
KFC				
Intercept	1	0.2405	18.87	<.0001
Electronic Advertising	1	4.325E-10	4.05	0.0008
Print Advertising	1	-8.048E-9	-1.23	0.2366
Outdoor Advertising	1	8.7185E-9	1.17	0.2563
FAFH Annual Expenditures	1	-6.254E-7	-9.92	<.0001
Total R-Square= 0.9735; DFE= 17; Durbin-Watson= 1.5851				
McDonald's				
Intercept	1	0.2147	8.80	<.0001
Electronic Advertising	1	1.1962E-9	5.78	<.0001
Print Advertising	1	3.474E-10	0.52	0.6121
Outdoor Advertising	1	-1.581E-8	-3.39	0.0035
FAFH Annual Expenditures	1	-5.416E-7	-4.51	0.0003
Total RSQ= 0.8336; DFE= 17 Durbin-Watson = 1.2567				
Pizza Hut				

Intercept	1	0.1515	4.16	0.0007
Electronic Advertising	1	-3.09E-10	-1.20	0.2491
Print Advertising	1	2.5339E-8	1.11	0.2850
Outdoor Advertising	1	4.5877E-8	1.77	0.0951
FAFH Annual Expenditures	1	-1.916E-7	-1.27	0.2214
Total RSQ= 0.9515; DFE= 16 Durbin-Watson = 0.9488				
Sonic				
Intercept	1	-0.0191	-1.53	0.1468
Electronic Advertising	1	2.913E-10	2.29	0.0363
Print Advertising	1	-8.771E-9	-0.82	0.4263
Outdoor Advertising	1	-4.359E-9	-0.40	0.6917
FAFH Annual Expenditures	1	1.7646E-7	3.33	0.0042
Total RSQ= 0.9916; DFE= 16 Durbin-Watson = 0.7384				
Subway				
Intercept	1	-0.1696	-6.94	<.0001
Electronic Advertising	1	-1.2E-10	-0.79	0.4422
Print Advertising	1	2.8056E-9	1.34	0.2010
Outdoor Advertising	1	-8.228E-9	-1.22	0.2399
FAFH Annual Expenditures	1	9.2652E-7	8.56	<.0001
Total RSQ= 0.9940; DFE= 15 Durbin-Watson = 1.6001				
Taco Bell				
Intercept	1	-1383858	-0.57	0.5781
Electronic Advertising	1	0.0251	1.90	0.0757
Print Advertising	1	0.3980	1.62	0.1245
Outdoor Advertising	1	8.7185E-9	1.17	0.2563
FAFH Annual Expenditures	1	0.0210	0.07	0.9457
Total R-Square= 0.9824; DFE= 16; Durbin-Watson= 0.9369				
Wendy's				
Intercept	1	0.2147	8.80	<.0001
Electronic Advertising	1	1.1962E-9	5.78	<.0001
Print Advertising	1	3.474E-10	0.52	0.6121

Outdoor Advertising	1	-1.581E-8	-3.39	0.0035
FAFH Annual Expenditures	1	-5.416E-7	-4.51	0.0003
Total RSQ= 0.8336; DFE= 17 Durbin-Watson = 1.2567				

Table 13: Final consumption— Advertising and Market share model

	Df	b value	t ratio	p-level
Dominos				
Intercept	1	0.1168	5.46	<.0001
FAFH Annual Expenditures	1	-2.14E-7	-2.66	0.0156
Total RSQ= 0.8659; DFE= 19 Durbin-Watson = 1.4953				
Jack-In-the-Box				
Intercept	1	0.0277	37.46	<.0001
Electronic Advertising	1	6.452E-10	9.30	<.0001
Print Advertising	1	2.324E-8	2.41	0.0268
Outdoor Advertising	1	-2.742E-8	-3.00	0.0077
Total RSQ= 0.8739; DFE= 18 Durbin-Watson = 1.3342				
KFC				
Intercept	1	0.2452	19.85	<.0001
Electronic Advertising	1	5.1E-10	5.34	<.0001
FAFH Annual Expenditures	1	-6.505E-7	-10.75	<.0001
Total R-Square= 0.9746; DFE= 17 Durbin-Watson= 1.1743				
McDonald's				
Intercept	1	0.2216	11.07	<.0001
Electronic Advertising	1	1.2637E-9	8.05	<.0001
Outdoor Advertising	1	-1.486E-8	-3.54	0.0023
FAFH Annual Expenditures	1	-5.774E-7	-6.02	<.0001
Total RSQ= 0.8310; DFE= 18 Durbin-Watson = 1.2221				
Pizza Hut				
Intercept	1	0.1111	8.31	<.0001
Electronic Advertising	1	-4.33E-10	-1.95	0.0666
Total RSQ= 0.9335; DFE= 19 Durbin-Watson = 0.8890				
Sonic				
Intercept	1	-0.0175	-1.55	0.1392
Electronic Advertising	1	2.932E-10	2.42	0.0263
FAFH Annual Expenditures	1	1.6819E-7	3.53	0.0024

Total RSQ= 0.9911; DFE= 18 Durbin-Watson = 0.9216				
Subway				
Intercept	1	-0.1424	-15.71	<.0001
FAFH Annual Expenditures	1	8.01E-7	23.21	<.0001
Total RSQ= 0.9642; DFE= 20 Durbin-Watson = 0.4009				
Taco Bell				
Intercept	1	-3975190	-1.80	0.0872
Electronic Advertising	1	5.1E-10	5.34	<.0001
FAFH Annual Expenditures	1	30.0832	3.71	0.0015
Total R-Square= 0.9762; DFE= 19 Durbin-Watson= 1.1094				
Wendy's				
Intercept	1	0.2216	11.07	<.0001
Electronic Advertising	1	1.2637E-9	8.05	<.0001
Outdoor Advertising	1	-1.486E-8	-3.54	0.0023
FAFH Annual Expenditures	1	-5.774E-7	-6.02	<.0001
Total RSQ= 0.8310; DFE= 18 Durbin-Watson = 1.2221				

Testing for Structural Breaks

One of the most important assumptions in a time series model is that the process being examined is consistent across all observations in the data sample. Thus, it becomes important to analyze the periods or points in the time series data that witness a change to ensure that the process being studied in consistent throughout the time period being considered. There are a number of statistical procedures that can be utilized to test for the equality of coefficient between groups of two or more. A common procedure used in marketing and advertising research is known as the Chow test (Chow, 1960) which provides an F-test. Specifically, the Chow test is used to test whether the coefficients in two linear regressions on different data sets are equal and is often used in time series analysis to test for the presence of a structural break.

Suppose that the model for a given data is:

$$y_t = a + bx_{1t} + cx_{2t} + \varepsilon.$$

If the given data into split into two groups, then:

$$y_t = a_1 + b_1 x_{1t} + c_1 x_{2t} + \varepsilon.$$

and

$$y_t = a_2 + b_2 x_{1t} + c_2 x_{2t} + \varepsilon.$$

As mentioned earlier the Chow test is widely used to test for structural change in some or all of the parameters of a model in cases where the disturbance term is assumed to be the same in both periods. The Chow test applies an F-test on the data, and requires

the sum of squared errors from three regressions - one for each sample period and one for the pooled data.

In the current study, the relationship between advertising expenditures and aggregate and brand sales revenues in the QSR industry in the United States is examined from 1986 to 2007. During the period of 2000 to 2007 QSR firms faced heavy criticism in popular media. Since the early 2000s, QSR companies, often referred to as "fast-food" firms have faced growing disapproval from popular media and large consumer groups such as Center for Science in the Public Interest. The escalating tensions between media, consumer groups, and QSR firms were heightened with the release of U.S. national bestselling book "Fast Food Nation" which appeared in 2001. Soon after, in 2002 a man named Caesar Barber attempted to sue leading fast food firms namely, McDonald's, Wendy's and KFC for his obesity. Although the law suit never made it to court, it received ample publicity in popular press, television stations and so on (Krum, 2002). That was followed by a documentary in 2004 "Supersize Me," in which an independent filmmaker documented the effects of eating McDonald's food continuously for one month. The documentary also grew in public popularity and was nominated for the Best Academy Award for Documentary Feature. Later in 2006, the movie for fast food nation appeared which a hit in the box-office. The movie was premiered at the prestigious Cannes Film Festival in May 2006, and grossed $1,005,539 in the United States (New York Times, 2006).

Bearing in mind this period of growing public criticism towards QSR firms, this study uses a Chow test to analyze the data for a structural break from 2000 onwards. That is: Does the relationship between advertising expenditures and sales revenues change during the observed period of time for the QSR industry and QSR firms? It is important to know whether the relationship between advertising and sales was different before and after the QSR firms faced heavy criticism in the media, consumer groups and customers. So the Chow test is used to determine whether there is a structural break for the aggregate and brand level models. Table 14 shows the results of the Chow test for the aggregate level models, and Table 15 presents the results for the brand level models.

Results from the Chow test for the aggregate models indicate that no structural break is present for the aggregate model, while for the model in which advertising expenditures are broken down by each media, a structural break is present (see Table 16). That is, the relationship between advertising expenditures by media and sales differs from 1986 to 1999 and 2000 to 2007.

Table 14: Results of Chow test for structural changes in the effect of total advertising on aggregate sales for QSR firms

Brands		Chow Test		
		Statistic F	p-value	
A1		2.930047	0.065463	N/C
A2		3.248538	0.048093	S/C
a. Break point in 2000.				

Notes:

1. Brands: [B = Brand of QSR Firm]

    a. A1: Aggregate model with total advertising.
    b. A2: Aggregate model with advertising by media type.

2. S/C indicates structural change i.e. the null hypothesis of no structural change is rejected at $p<.05$;
3. N/C indicates no structural change i.e. the null hypothesis of no structural change cannot be rejected at $p.<.05$.

In light of the results of the Chow test, separate regressions were preformed for each period (1986 to 1999; and 2000-2007) for the aggregate advertising by media model. Results from these tests are shown in Tables 15—18. From the tables below we can infer that from 1986 to 1999, electronic and outdoor advertising expenditures had a positive and significant impact on sales for QSR firms in the United States. In the second period (2000 to 2007) print advertising expenditures had a significant and positive effect on sales for QSR firms in the United States. In contrast, outdoor advertising expenditures had a negative and significant effect on sales for QSR firms in the United States from 2000 to 2007.

Table 15: Full consumption— Aggregate Advertising by media and sales model

1986—1999

	Df	b value	t ratio	p-level
Aggregate Advertising by Media				
Intercept	1	-3731	-7.32	<.0001
Electronic Advertising	1	1.4586E-6	2.28	0.0482
Print Advertising	1	4.3342E-7	0.02	0.9880
Outdoor Advertising	1	0.000284	2.09	0.0662
FAFH Annual Expenditures	1	0.0233	8.88	<.0001
Total RSQ= 0.9930; DFE= 9 Durbin-Watson = 1.3899				

Table 16: Final consumption— Aggregate Advertising by media and sales model

1986—1999

	Df	b value	t ratio	p-level
Aggregate Advertising by Media				
Intercept	1	-3731	-7.74	<.0001
Electronic Advertising	1	1.4588E-6	2.41	0.0367
Outdoor Advertising	1	0.000285	2.33	0.0421
FAFH Annual Expenditures	1	0.0233	9.39	<.0001
Total RSQ= 0.9930; DFE= 10; Durbin-Watson = 1.3912				

Table 17: Full consumption— Aggregate Advertising by media and sales model 2000—2007

	Df	b value	t ratio	p-level
Aggregate Advertising by Media				
Intercept	1	-6820	-10.51	0.0018
Electronic Advertising	1	-7.746E-7	-1.19	0.3201
Print Advertising	1	0.0000274	4.59	0.0194
Outdoor Advertising	1	-0.000238	-2.72	0.0724
FAFH Annual Expenditures	1	0.0376	11.96	0.0013
Total RSQ= 0.9987; DFE=3 Durbin-Watson = 2.3607				

Table 18: Final consumption— Aggregate Advertising by media and sales model 2000—2007

	Df	b value	t ratio	p-level
Aggregate Advertising by Media				
Intercept	1	-6150	-18.25	<.0001
Print Advertising	1	0.0000248	4.25	0.0132
Outdoor Advertising	1	-0.000243	-2.64	0.0576
FAFH Annual Expenditures	1	0.0341	27.82	<.0001
Total RSQ= 0.9930; DFE= 10; Durbin-Watson = 1.3912				

Results from the Chow test for the brand level models shows that in seven out of nine brands no structural break is present in the current data (Jack-in-the-Box, KFC, McDonald's, Pizza Hut, Sonic, Subway and Wendy's). For two brands (Domino's and

Taco Bell), a structural break was present. That is, the relationship between advertising expenditures and sales for these two brands is different in the two observed time periods i.e. 1986 to 19999 and 2000 to 2007 (See Table 19).

Table 19: Results of Chow test for structural changes in the effect of brand advertising on sales for QSR firms

Brands		Chow Test		
		Statistic F	p-value	
B1		4.289096	0.020714	S/C
B2		0.479417	0.784670	N/C
B3		0.244407	0.934104	N/C
B4		1.113433	0.407465	N/C
B5		2.312421	0.114557	N/C
B6		1.646620	0.456874	N/C
B7		1.233362	0.357112	N/C
B8		3.751229	0.031550	S/C
B9		1.009013	0.456874	N/C
a. Break point in 2000.				

Notes:

1. Brands: [B = Brand of QSR Firm]

B1: Domino's	B2: Jack-in-the-Box	B3: KFC	B4: McDonald's	B5: Pizza Hut
B6: Sonic	B7: Subway	B8: Taco Bell	B9: Wendy's	ALL: Aggregate.

2. S/C indicates structural change i.e. the null hypothesis of no structural change is rejected at $p< 0.05$;
3. N/C indicates no structural change i.e. the null hypothesis of no structural change cannot be rejected at $p.<0.05$

As the results of the Chow test for Domino's and Taco Bell indicated a structural break in the data from 1986 to 1999 and 2000 to 2007. The regressions models for each brand were run separately for each time period (1986 to 1999 and 2000 to 2007). The results of these tests are shown below in Tables 20 to 27. Specifically, for Dominos from 1986 to 1999 print advertising and outdoor advertising had a significant and positive effect on sales (See Tables 20, 21). While, from 2000 to 2007 only FAFH expenditures had a positive and significant effect on sales for Dominos (See Tables 22, 23).

Table 20: Full consumption— Domino's brand advertising and sales model 1986—1999

	Df	**b value**	**t ratio**	**p-level**
Domino's				
Intercept	1	930584	1.27	0.2348
Electronic Advertising	1	0.002413	0.16	0.8732
Print Advertising	1	1.0209	1.71	0.1224
Outdoor Advertising	1	-5.6769	-2.10	0.0648
FAFH Annual Expenditures	1	6.1647	2.13	0.0622
Total RSQ= 0.7354; DFE= 9 Durbin-Watson = 1.3041				

Table 21: Final consumption— Domino's brand advertising and sales model 1986—1999

	Df	b value	t ratio	p-level
Domino's				
Intercept	1	920959	1.33	0.2128
Print Advertising	1	1.0564	1.99	0.0444
Outdoor Advertising	1	-5.4780	-2.39	0.0379
FAFH Annual Expenditures	1	6.2276	2.28	0.0456
Total RSQ= 0.7346; DFE= 10 Durbin-Watson = 1.3051				

Table 22: Full consumption— Domino's brand advertising and sales model 2000—2007

	Df	b value	t ratio	p-level
Domino's				
Intercept	1	1665031	2.31	0.1036
Electronic Advertising	1	0.001827	0.57	0.6070
Print Advertising	1	0.3062	0.60	0.5885
Outdoor Advertising	1	1.4170	0.56	0.6125
FAFH Annual Expenditures	1	3.7804	1.49	0.2336
Total RSQ= 0.9522; DFE= 3 Durbin-Watson = 2.3679				

Table 23: Final consumption— Domino's brand advertising and sales model 2000—2007

	Df	b value	t ratio	p-level
Domino's				
Intercept	1	-119269	-0.20	0.8472
FAFH Annual Expenditures	1	10.0434	3.92	0.0020
Total RSQ= 0.5617; DFE= 12 Durbin-Watson = 1.3051				

As can be inferred from the tables below (See Tables 24— 27) none of the three advertising expenditures (electronic, print and outdoor) had a significant effect on sales for Taco Bell during 1986 to 2000 and 2000-2007. In both time periods only FAFH expenditures showed a positive and significant relationship with sales for Taco Bell from 1986 to 1999 and 2000 to 2007.

Table 24: Full consumption— Taco Bell brand advertising and sales model 1986-— 1999

	Df	b value	t ratio	p-level
Taco Bell				
Intercept	1	-10815615	-3.89	0.0037
Electronic Advertising	1	0.007419	0.33	0.7474
Print Advertising	1	0.7686	0.43	0.6806
Outdoor Advertising	1	-0.3902	-0.46	0.6535
FAFH Annual Expenditures	1	59.4349	-5.98	0.0017
Total RSQ= 0.9511; DFE= 9 Durbin-Watson = 0.9113				

Table 25: Final consumption— Taco Bell brand advertising and sales model 1986— 1999

	Df	b value	t ratio	p-level
Taco Bell				
Intercept	1	-11667315	-11.48	<.0001
FAFH Annual Expenditures	1	63.6212	14.80	<.0001
Total RSQ= 0.9481; DFE= 12 Durbin-Watson = 0.7069				

Table 26: Full consumption— Taco Bell brand advertising and sales model 2000—2007

	Df	b value	t ratio	p-level
Taco Bell				
Intercept	1	5136407	--	--
Electronic Advertising	1	0.0290	1.90	0.1016
Print Advertising	1	0.5779	2.48	0.0890
Outdoor Advertising	1	0.3165	0.61	0.5863
FAFH Annual Expenditures	1	-5.0798	-0.54	0.6239
Total RSQ= 0.9749; DFE= 3 Durbin-Watson = 2.0904				

Table 27: Final consumption— Taco Bell brand advertising and sales model 2000—2007

	Df	b value	t ratio	p-level
Taco Bell				
Intercept	1	-11667315	-11.48	<.0001
FAFH Annual Expenditures	1	63.6212	14.80	<.0001
Total RSQ= 0.9481; DFE= 12 Durbin-Watson = 0.7069				

Persistence Analysis

In Physics, the term hysteresis is used to describe the process by which a piece of iron is permanently magnetized by an electric shock. In the 1980s the concept of hysteresis has been applied in the study of economic phenomena with much success. For example, a short-term change in the rate of inflation for a given country can produce a persistent impact on the rate of unemployment (Blanchard and Summers, 1988; Gordon, 1989). Another example is of a temporary change in currency exchange rates can have a sustaining effect on the exports for a given country (see Dixit, 1989). Presently, the concept of hysteresis has become an essential part of New Keynesian economics (Mankiw and Romer, 1991). The application of the concept of hysteresis came much later to the study of marketing and advertising. Dekimpe and Hanssens (1995a,b, 1999) were the first to adapt the concept of hysteresis to study marketing. Using time-series data, the authors investigated the long-term impact of short-term stimuli on sales, thereby developing persistence models.

Firms engage in short-term based advertising tactics in an effort to increase their sales. Once the marketing stimulus (ex. Advertising, price promotion, and so on) are ceased, the sales return to the original level, this is known as zero persistence. The "shock effect" in this case decays and the series is called stationary. But this need not be the case. In some instances, the sales may remain at a higher level for a long period, even after the marketing stimulus (advertising) is removed; this is known as full persistence. In this instance, the data series is "evolving", that short-term advertising has a long-term

effect on the sales for a particular brand or product. It should be noted that full persistence is rare. However, there are times at which firms may only require maintenance marketing to sustain part of their persistence. This has important relevance to marketing as long-term performance is an issue of central importance in marketing. Marketing managers, advertising agencies and media firm representative are often faced with the mammoth task of having to quantify how specific marketing budgets contribute to the long-term revenue of a firm. Thus, persistence models provide an important tool in analyzing the relationship between advertising expenditures and sales (Dekimpe and Hanssens, 1999).

As a result, Dekimpe and Hanssens (1995b) conducted a study employing the use of univariate time-series data from 1975 to 1994 published in nine leading journals, such as Journal of Advertising, Journal of Marketing Research and Journal of Marketing, to name a few. Findings from this study suggest that with regard to sales for consumer goods in U.S. and Canadian markets, 72 percent of the consumer goods in the sample were "evolving". That is, sales for these goods were driven predominantly by the past and not current factors. In light of these results, Dekimpe and Hanssens (1995a; 1995b) underscore the usefulness of persistence modeling to managers and advertisers, who can examine the marketing factors that influence the market performance of their goods.

Another recent application of persistence modeling is a study on the Chinese durable market by Ouyang, Zhou and Zhou (2002). In this study, Ouyang, et. al (2002) developed an econometric model to estimate the effect of marketing persistence, and apply this model to the durable goods market in China. Results indicate that marketing

"shock" does indeed create a long-term effect on firm's sales performance for durable goods in China. Similarly, in another study, using cross-sectional time-series TV advertising and sales data, Zhou, Zhou and Ouyang, (2003) examine the durable and non-durable goods market in China. The authors analyze the effect of short-term advertising on long-term sales of consumer durables and non-durables in China. Results for this study suggest that there are different impacts of short-term advertising on long-term sales for durables and non-durables in China. Specifically, for durable goods, short-term advertising has a lasting effect on sales, while for non-durable goods this persistence effect is absent. These results provide empirical support for consumer behavior and advertising literature which suggest that the level of consumer involvement with the product of purchase will moderate the effect of short-term advertising on long-run sales (Assael 1998; Krugman 1965; Shimp 2000; Slama and Tashchian 1987; Vaughn 1980, 1986). However, the authors caution that advertising may be even more important for low-involvement products. The authors underscore that many popular brands use brand image advertising and frequent reminder advertising to remain competitive in the market.

In the current persistence modeling is used to assess the effects of different advertising expenditures across three measured media, namely electronic, print and outdoor advertising on sales. It is hoped that results from this analysis will provide further insight into the long-term advertising effect on sales across different media.

Model

Based on previous research by Zhou, et. al (2003) and Ouyang, et. al (2002) the following model is used:

S (t) = α + δ *t* + β S (t-1) + b1 (L) ELEC AD (t) + b2 (L) Δ ELEC AD (t) + b3 (L) PRINT AD (t) + b4 (L) Δ PRINT AD (t) + b5 (L) OUT AD (t) + b6 (L) Δ OUT AD (t) + b7 P (t) + u(t)

where:

S(t) = sales at time t

S(t-1) = sales at time t-1

ELEC AD(t)= electronic advertising expenditure

Δ ELEC AD(t) = ELEC AD(t) – ELEC AD(t-1) is the change in electronic advertising activities

PRINT AD(t)= print advertising expenditure

Δ PRINT AD(t) = PRINT AD(t) – PRINT AD(t-1) is the change in print advertising activities

OUT AD(t)= outdoor advertising expenditure

Δ OUT AD(t) = OUT AD(t) – OUT AD(t-1) is the change in outdoor advertising activities

P(t)= environmental variable, the price index at time t

u(t) = error item

α, β, b1, b2, and b3 = coefficients to be estimated

If the changes observed in sales, S(t) is attributed to advertising activity AD(t), then the short-term shock effect of AD(t) on S(t) is carried over. Additionally, bi (L) (i=1,2) are lag polynomials representing temporary and delayed response effects of advertising on sales, i.e., bi (L) = b0i + b1i L + b2i L2 + … This specification allows the model to capture the persistence metric. The advertising activity is isolated from other environmental variables included i.e., P(t).

So, the degree of market persistence is measured as:

ρ = b2 (L) / [b1 (L) + b2 (L)]

If the degree of persistence, denoted by ρ, is not significantly different from zero, i.e., b2(L) is very small compared with b1(L), it can be concluded that the changes in S(t) are mainly attributed to AD(t)— these two variables have a functional relationship: S(t) = *f*(AD(t)). However, if ρ is close to unity, i.e., b1(L) is very small compared with b2(L), S(t) is largely a result of changes in ΔAD(t) and the current level of advertising activities does not affect S(t): S(t) = *f*(ΔM(t)). P(t) represents environmental variables expected to affect sales, namely the price index for food away from home (FAFH).

Other factors such as the FAFH variable used in the current model cannot be directly observed; rather their effects are embedded in the sales of an earlier period, as previous sales (β S (t-1)). These variables are included in order to enhance the quality of

the regression, namely the *R*-square value (Zhou, 2003). The above stated tests were performed in *E-Views 5.0* computer software program.

Additionally, a unit root test was performed in an effort to establish whether or not the sales series were evolving (Dekimpe and Hassens, 1995a; Zhou, et. al 2003). If the sales series was evolving, then the same test was applied to the corresponding advertising data series. The tests preformed include the Augmented Dickey-Fuller test (Dickey and Fuller, 1981) and the Phillips-Perron test (Phillips and Perron, 1988). Brands that passed both tests were used for further analysis. In addition, a cointegration test, specifically, the Johansen test, between advertising variables and sales were preformed. Again, only those brands that passed these tests were included in the analysis. If the two time-series were cointegrated, then the above stated equation was used to estimate the magnitude of the persistence effect.

Results

Results for the aggregate level data, indicate that ρ_2 is close to unity ($\rho_{2=}$ 0.968562222), this implies that sales or S(t) appears to determined by changes in electronic advertising expenditures or Δ ELEC AD (t) and the current level of electronic advertising does not affect sales, or S(t) = f(Δ ELEC AD(t). Thus, changes in electronic advertising expenditures have a significant marketing persistence effect on sales for aggregate level data (See Tables 30).

Brand level analysis, yielded mixed results (See Table 31). For five brands out of nine brands (KFC, Pizza Hut, Sonic, Subway and Wendy's) only previous sales (sales (t-1)) had a significant impact on current sales. That is, no significant effect was detected

for all six measures of advertising expenditures (electronic advertising expenditures, change in electronic advertising expenditures, print advertising expenditures, changes in print advertising expenditures, and outdoor advertising expenditures and changes in outdoor advertising expenditures). For one brand (Domino's) only FAFH showed a significant effect on sales. The remaining two brands (Jack-in-the-Box and McDonald's) showed a significant impact of advertising expenditures on sales.

Specifically, for Jack-in-the-Box ρ_1 is not close to unity ($\rho_{1=}$ 0.48276537), this implies that sales, S(t) is mainly determined by current print advertising expenditures, PRINT AD (t). The changes in print advertising expenditure for Jack-in-the-Box does not affect its sales, or S(t) = f(PRINT AD(t). Thus, current print advertising expenditures have a significant marketing persistence effect on sales for Jack-in-the-Box.

Results for McDonald's indicates that ρ_2 is also not close to unity ($\rho_{2=}$ 0.695135959), this implies that McDonald's sales or S(t) is largely explained by current electronic advertising expenditures or ELEC AD (t) and that the changes in electronic advertising expenditure does not affect sales. So for McDonald's S(t) = f(ELEC AD(t). That is McDonald's current electronic advertising expenditures have a significant marketing persistence effect on its brand sales.

Table 28: Results of Unit Root Tests

Brand	**Sales**		**Electronic Advertising**		**Print Advertising**		**Outdoor Advertising**	
	ADF	P-P	ADF	P-P	ADF	P-P	ADF	P-P
B1	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
B2	Yes*	Yes*	No	No	No	No	Yes*	Yes*
B3	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
B4	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
B5	No	No	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
B6	Yes**	Yes**	Yes*	Yes*	Yes*	Yes*	No	No
B7	Yes**	Yes**	No	No	Yes*	Yes*	Yes*	Yes*
B8	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
B9	No	No	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*
ALL	Yes*	Yes*	Yes*	Yes*	Yes*	Yes*	No	No

Notes:

1. Brands: [B = Brand of QSR Firm]

B1: Domino's B2: Jack-in-the-Box B3: KFC B4: McDonald's B5: Pizza Hut
B6: Sonic B7: Subway B8: Taco Bell B9: Wendy's ALL: Aggregate.

2. Sales are in thousands of U.S. Dollars.
3. ADF: Augmented Dickey-Fuller test
4. P-P: Phillips-Perron test
5. Yes: the series has a unit root
6. No: the series has no unit root
7. *: $p < 0.05$
8. **: $p < 0.10$

Table 29: Results of Cointegration Tests of Brand Sales and Advertising variables

Brand	Electronic Advertising	Print Advertising	Outdoor Advertising
	J	J	J
B1	No	No	Yes*
B2	Yes*	Yes*	Yes*
B3	Yes*	Yes*	Yes*
B4	Yes*	No	Yes*
B5	No	Yes*	Yes*
B6	No	Yes*	Yes*
B7	No	No	No
B8	Yes*	Yes*	Yes*
B9	No	Yes*	No
ALL	Yes*	Yes*	No

Notes:

1. Brands: [B = Brand of QSR Firm]

B1: Domino's B2: Jack-in-the-Box B3: KFC B4: McDonald's B5: Pizza Hut
B6: Sonic B7: Subway B8: Taco Bell B9: Wendy's ALL: Aggregate.

2. Sales are in thousands of U.S. Dollars.
3. Johansen test
4. Yes: the series of sales and advertising are cointegrated
5. No: the series of sales and advertising are not cointegrated
6. *: $p < 0.05$

Table 30: Results of Persistence Estimation—Aggregate Level Analysis

	Coefficient
C	-1.31E+09 (1.72E+09)
Sales (t-1)	0.830194 (0.123373)
(L) Print Ad(t)	2712.176 (1433.024)
(L) Δ Print Ad(t)	-1112.578 (1087.656)
(L)Elec Ad(t)	36.11227 (11.11382)
(L) Δ Elec Ad(t)	36.91763 (21.18688)
(L) Out Ad(t)	578.7271 (524.815)
(L) Δ Out Ad(t)	675.5838 (467.3691)
FAFH	9402.792 (9413.52)
Adjusted R-squared	0.99957
Durbin-Watson	2.92254
ρ1	0.290888774
ρ2	0.968562222
ρ3	0.494486094

Notes:

1. The numbers in the brackets are standard errors.
2. Strength of persistence (ρ): statistically significant estimates are in **bold**.

Table 31: Results of Persistence Estimation—Brand Level Analysis

	B1	B2	B3	B4	B5	B6	B7	B8	B9
C	-515420.3 (5924305)	3560300 (4005347)	-10537725 (23274090)	1.12E+08 (98555853)	24739423 (26149018)	258318.6 (1596940)	-148473.5 (1646712)	-9747788 (10090115)	-4093960 (31659457)
Sales (t-1)	0.775005 (0.071699)	0.84184 (0.073937)	0.793331 (0.089511)	0.814245 (0.076926)	0.851071 (0.099062)	0.793216 (0.08255)	0.783958 (0.106415)	0.839678 (0.067374)	0.773012 (0.094906)
(L) Print Ad(t)	11.99939 (6.478086)	-12.28242 (7.697043)	-9.655048 (10.54234)	-0.71447 (2.256228)	18.01462 (21.61348)	-0.25965 (3.963923)	-0.073411 (0.284292)	-2.921723 (2.314259)	-0.042676 (0.592438)
(L) Δ Print Ad(t)	-5.496135 (3.766437)	13.15938 (5.842818)	6.639983 (7.272624)	0.914459 (1.619173)	-9.16131 (13.51093)	-2.33292 (2.81819)	0.06128 (0.369621)	1.346639 (1.502051)	0.306438 (0.43509)
(L)Elec Ad(t)	-0.021406 (0.06667)	0.093042 (0.064967)	-0.041893 (0.149977)	0.401052 (0.257384)	0.337423 (0.232761)	0.023313 (0.057636)	0.003985 (0.012449)	-0.129529 (0.07681)	0.054979 (0.209968)
(L) Δ Elec Ad(t)	0.012289 (0.058446)	-0.105976 (0.12974)	0.004094 (0.161142)	-0.555554 (0.252353)	-0.27369 (0.194965)	0.04395 (0.098306)	-0.010302 (0.033489)	-0.053741 (0.067233)	-0.268014 (0.140098)
(L) Out Ad(t)	-39.21156 (27.74479)	3.77241 (2.1849)	11.32252 (10.58783)	3.56519 (2.695761)	-17.65664 (15.75661)	-1.26752 (6.699203)	0.231022 (1.116064)	9.510848 (3.947015)	1.089265 (3.401937)
(L) Δ Out Ad(t)	21.66793 (16.91336)	-2.939246 (2.129211)	-4.601441 (9.084567)	-2.527833 (1.788868)	19.96896 (13.69072)	-1.92814 (5.323772)	-0.191856 (1.255608)	-6.619948 (2.395216)	-0.845392 (2.879605)
FAFH	225.0544 (77.39604)	44.11314 (39.37481)	387.3369 (216.8913)	589.9868 (836.5449)	99.29392 (237.5128)	39.12238 (19.79968)	27.53478 (17.58115)	191.7527 (84.41334)	391.9802 (270.8955)
Adjusted R-squared	0.99957	0.999251	0.998723	0.999213	0.998737	0.999081	0.99877	0.999245	0.99894
Durbin-Watson	1.59589	1.59589	1.234246	0.905831	1.605504	0.905745	1.194473	1.378942	1.045975
ρ1	0.68585481	**0.48276537**	0.592514859	0.438613347	0.66288881	0.100151587	0.545032704	0.684506844	0.122240873
P2	0.99612037	0.99297925	0.993730354	**0.695135959**	0.96447705	0.990105817	0.93894124	0.912253212	0.847879319
P3	0.63528713	0.46750545	0.910974841	0.419244705	0.55214502	0.34659471	0.278924897	**0.706765974**	0.170217311

Notes:

7. Brands: [B = Brand of QSR Firm]

B1: Domino's	B2: Jack-in-the-Box	B3: KFC	B4: McDonald's	B5: Pizza Hut
B6: Sonic	B7: Subway	B8: Taco Bell	B9: Wendy's	

8. The numbers in the brackets are standard errors.
9. Strength of persistence (ρ): statistically significant estimates are in **bold**.

Summary

Overall, the results of hypotheses testing and findings in this chapter showed support for the three hypotheses proposed. At the aggregate level support was found for the hypothesis that total aggregate advertising expenditures will have a positive and significant relationship with sales revenues for QSR firms in the United States from 1986 to 2007. With regard to specific advertising expenditures by media, support for hypothesis 2c was found, that is, total outdoor advertising expenditures will have a positive and significant impact on sales for QSR industry during the observed period.

With regard to brand level results, support for hypothesis 3a, electronic advertising expenses for each QSR brand will have a positive effect on brand sales in the United States from 1986 to 2007 was found for three brands: Jack-in-the-Box, Sonic, Subway and Wendy's. For hypothesis 3b, brand print advertising expenditures was hypothesized to have a positive and significant impact on brand sales. Support was found for three brands, namely Domino's, Jack-in-the-Box and Wendy's. Lastly, hypothesis 3c predicted that brand outdoor advertising will have a positive and significant effect on sales for each QSR brand. Results showed support for hypothesis 3c for three brands: Domino's McDonald's, and Wendy's.

In the next chapter the findings and implications of the current study are discussed. The limitations present in the current study are also mentioned as well as directions for future research.

CHAPTER 6

CONCLUSIONS, IMPLICATIONS AND FUTURE RESEARCH

Introduction

In Chapter 6: Conclusions the findings of the current study are discussed and the ramifications of the results are presented in detail. The chapter commences with a discussion on the goals and objectives of the study. Next, the research hypotheses and methodology that were employed are restated. Subsequently, the chapter focuses on a discussion of the study results and its pertinence to practice and theory. In the end, the limitations of the present study are provided as well as directions and recommendations for future research.

This dissertation examined the relationship between advertising and sales revenue at the aggregate and brand level for the QSR industry in the United States from 1986 to 2007. Two main objectives of this study were to: 1) analyze the effect of advertising expenditures on sales revenue within the QSR industry; and 2) provide analysis of the relationship between advertising and sales revenues for QSR firms, in the United States during the observed period. Thus, the current study provides the most comprehensive analysis of the relationships between advertising and sales in the QSR industry to date.

A stepwise regression analysis with backwards elimination of non-significant predicators was utilized to select a set of statistically significant predictor variables. In

analyzing the relationship between advertising expenditures and QSR aggregate and brand sales revenues, this study controlled for factors expected to affect sales revenues such as population size, price and inflationary effects. Regression analysis was conducted for aggregate and brand level data. In addition several post hoc analyses were also preformed. First, regression analysis on the effect of advertising expenditures on market share was executed. Second, a Chow test (Chow, 1960) was conducted on the aggregate and brand level models to test for the presence of structural breaks in the data. Third, persistence modeling was used to assess the effects of different advertising across three measured media (electronic, print and outdoor advertising expenditures) on sales. Marketing persistence models measure the effect of short-term changes in advertising expenditures on long-term sales (see, e.g., Dekimpe and Hanssens 1995a, 1995b, 1999; Mohrle 1997; Simon 1997). Persistence modeling provides an analysis of the long-term effect of short-term advertising efforts on sales. It offers a directional model that measures the quantitative magnitude of each variable. In addition, the model includes a trend variable (t) in an effort to eliminate the market growth effects while explaining the advertising-sales relationship. Since the QSR has experienced rapid market expansion over the past two decades it is important to control for this while looking at the relationship between advertising expenditures and sales.

Implications of Study Findings

One of the major findings of this study was that aggregate advertising expenditures and aggregate sales for the QSR industry in the United States were

significantly related from 1986 to 2007. This is the first study to examine this relationship over such an extended period of time—the last twenty-two years. This result makes intuitive sense given the high amount of dollars spent by QSR firms on advertising. Yet industry experts argue that QSR advertising does not result in increased purchase; rather it leads to brand switching (Young, 2003).That is, advertising is aimed in aiding consumers in selecting a particular brand of QSR rather than influence their decision to eat fast food. Results from brand level analysis show that for certain brands; advertising shows an important relationship with sales. However, it is not easy to determine how important advertising is as a factor in explaining QSR sales. Important information such as price, promotions and sweepstakes, locations of outlets, changes in menu items and caloric information of menu items are effectively communicated to large audiences by mass media advertising.

The aggregate model that explains the relationship between aggregate level advertising and industry wide sales, showed a significant and positive relationship. These results are consistent with studies that report the presence of a positive and significant relationship between advertising expenditures and consumption variables across numerous industries (Borden, 1942; Walsh, 1982; Duffy, 1993; Wilcox, 2001; Mc Guinness and Cowling, 1975; Hamilton, 1972; Abernethy and Teel, 1986; Leeflang and Revijl, 1985; Ippolito and Mathios, 1995; Yiannaka et. al, 2002; Duffy, 1999).

The plots of aggregate advertising from 1986 to 2007 in constant dollar scale (Figure 2, Appendix A) show a positive trend indicating an increase of sales over time.

That is, advertising expenditures for the industry have been on the rise for the observed period of time (1986 to 2007). Similarly, the plot for aggregate sales for the category of QSR firms (Figure 1, Appendix A) also shows an increase in aggregate sales over the past of twenty-two years in the U.S. These two plots allow a visual understanding of the positive relationship found by the current study (Figure 3, Appendix A). Further, the finding that aggregate advertising expenditures are positively affecting aggregate sales revenues provides empirical support for Borden's classical study conducted in 1942. Specifically, Borden predicted that in industries that are expanding, advertising will have a positive effect on sales. Also, Borden states that if macro trends (such as population, usage habits, lifestyles, etc) are supportive of market growth advertising is likely to increase the macro trend.

This finding is an important contribution to the study of aggregate consumption and advertising expenditures, given that the QSR industry has to date not been examined. The QSR industry represents a major industry as well as a major category of advertisers in the United States. Understanding how advertising affects sales in this industry provides further insight and empirical evidence to advertisers and managers for the QSR firms. Although previous studies have examined many related industries such as the soft-drink industry, meat industry, fats, and so on, no previous study has examined the QSR industry. Thus, this study will contribute to the research literature by extending the current repertoire of industries studied. In addition, the majority of past studies have examined mature or declining markets; it is possible that many of the generalizations

inferred about the advertising and sales relationship are limited to those types of markets— more work needs to examine expanding markets.

The advertising variables in this study were broken by media outlet type: electronic, print and outdoor. Interestingly, for the aggregate model electronic advertising and print advertising did not display a positive and significant relationship with sales. This is a surprising finding, given that general expenditures for electronic advertising tend to be the highest for QSR. Outdoor advertising showed a significant and positive relationship with sales revenues, suggesting that tactically this is still a crucial advertising media for this product category. It may also be important to consider that billboard and other outdoor advertising do double service, they serve as advertising to remind and influence consumer's brand choice; and also may also act like signage, or directions indicating the outlet location. Thus, billboard advertising is persuasive in its nature but is also informative because it imparts information to the consumers about its location at the time of purchase.

The results from the brand level data provide mixed results. The findings are consistent with previous research (Lodish et. al, 1995a) which found that the relationship between advertising expenditures and sales vary by brand. With regard to electronic advertising expenditures and sales, four brands: 1) Jack-In-the-Box, 2) Sonic, 3) Subway and 4) Wendy's showed a positive and significant relationship. For print advertising, three brands: 1) Domino's, 2) Jack-In-the-Box and 3) Wendy's exhibited a positive and significant relationship with brand sales. Lastly, for outdoor advertising four brands: 1)

McDonald's, 2) Domino's and 3) Wendy's demonstrated a significant and positive relationship with brand sales.

These findings provide empirical support that for certain brands advertising expenditures have a positive and significant relationship with brand sales. Interestingly, the brands that display a positive relationship between advertising and sales are also brands that are well noted for their advertising and brand heritage. Companies such as McDonald's, Wendy's and KFC are the oldest firms in the category and are leaders in the market terms of their advertising expenditures, sales and market share. For example, Wendy's has focused its promotional efforts on maintain a consistent brand. Wendy's predominately centered their advertising on their founder and chief executive officer (CEO) Dave Thomas (Nation's Restaurant News, 2002). Their advertisements had a folksy and humorous quality which quickly became popular with audiences (New York Times, 1990). Dave Thomas appeared in over eight hundred commercial advertisements for Wendy's from 1989 to 2002 (Wendy's International, 2007).Upon Dave Thomas's death the company established a new tagline in their ad campaigns "made Dave's way" in an effort to maintain the strong connection consumers had made with their former CEO and their brand (Nation's Restaurant News, 2002).

Other brands such as KFC also enjoy a rich brand heritage, which draws heavily upon the brand's entrepreneur Colonel Sanders (Nation's Restaurant News, 1998). The firm had suffered in terms of its branding and sales due to the death of its founder in 1980 but recovered from this by developing a new advertising campaign that used an animated

colonel to promote its menu items. KFC also features soul music in its advertising which has been attributed the success and high recall of its ads (Marketing, 1995).

Additional brands that showed a positive relationship between advertising and sales include Jack-In-the-Box, Sonic and Subway. These brands are also noteworthy in terms of their advertising efforts. Sonic is well-known for their consistent brand image and theme throughout its promotional efforts. The firm's advertising messages are built around the brand as opposed to selling a particular menu item (Advertising Age, 2000). The company's advertisements mostly feature a carhop or drive-through scene. Sonic has focused its advertising efforts on building on the image of being America's drive through restaurant. In 2000, the company dedicated $35 million dollars to develop greater continuity in the look and feel of their commercials. Similarly, Jack-In-the-Box has been consistent in using humor as a tactic in their advertising. The firm's advertising features their cartoon like CEO, "Jack" who is the brand's icon featured in their advertisements (Adweek, 1997). Jack-in-the-Box has won several awards for their creative appeals (Adweek, 1997) and has also won Adweek best advertisement of the year in 1998, 2000, 2001 and 2004 (Jack-in-the-Box, Company Records, 2009).

Subway is differentiated in its advertising from competing QSR brands as its advertising has taken a shift towards focusing its advertising messages around health, this may be one of the reasons why the advertising for this brand shows a positive relationship with sales. In the recent years, QSR firms that have positioned themselves as healthy, such as Subway, have experienced more growth that those firms that are not

making those claims such as McDonald's, Wendy's or Sonic (Chandon and Wansinkhan, 2007). In addition, because of the unique positioning these ads may be more memorable to consumers. For example, Subway's TV advertisement that features Jared Fogle who compares a turkey sandwich from Subway with 280 calories, a Big Mac that has 560 calories, was the most recalled television ad during the 2004 holidays (Advertising Age, 2005).

With regard to Domino's, the results from the Chow test suggest the presence of a structural break in the data starting at 2000. That is, print and outdoor advertising expenditures were significantly and positively related to sales from 1986 to 1999. However, this relationship does not hold true during 1999 to 2007. This can also be inferred from the plots for Domino's advertising expenditures where a downward trend is present (Figures 17-18, Appendix B). During this time period Domino's suffered a loss in their revenues due to the launch of PizzaHut's delivery service (Advertising Age, 2002).

In the additional analysis, the effect of advertising on another measure of consumption, market share, was also explored for QSR firms in the United States during 1986 to 2007. Within this set of analysis five brands demonstrated a positive and significant relationship between electronic advertising expenditures and market share. The five QSR brands were: 1) McDonald's; 2) Wendy's; 3) KFC ; 4) Jack-In-the-Box and 5) Sonic. When examining the plots for electronic advertising expenditures and market share for these brands, a positive trend is present in all the plots for market share. That is, the aforementioned QSR brands have experienced an increase in their market

share over the observed period of time. Similarly, the electronic advertising expenditures have also increased from 1986 to 2007 for these brands (See Figures 2, 6, 8, 11 and14, Appendix B). Only one QSR brand, Jack-In-the-Box showed a positive and significant relationship between print advertising expenditures and market share. This relationship can be visually explained by the plots for Jack-In-the-Box's print advertising expenditures from 1986 to 2007 (See Figure 6, Appendix B) both of these show an upward trend. With respect to brand outdoor advertising expenditures and market share, three brands had a positive and significant relationship: 1) McDonald's; 2) KFC and 3) Jack-In-the-Box. This is not surprising given that market share for these three brands have been increasing over the past 21 years, as well as their outdoor advertising expenditures (See Figures 4, 8 and 10, Appendix C). The results of regression analysis provide empirical support that these two data series are trending upwards and share a positive relationship.

In addition to the above mentioned analysis, the current study also used a relatively new technique in examine the advertising and sales relationship called persistence modeling. The regression equations differed from the initial ones because it simultaneously considers the current effects of advertising as well as the effect of incremental increase in advertising on current sales. Findings from this set of analysis provide a few takeaways. For example, for McDonald's current electronic advertising expenditures showed a positive effect with current sales for the brand. Thus current electronic advertising expenditures have a positive effect on current sales for McDonald's

but past electronic advertising does not appear to have a significant effect on sales. Because this model considers both a lagged effect of advertising (past advertising or goodwill advertising) as well current advertising, this result demonstrates that for McDonald's current electronic advertising is more important in explaining sales than past advertising. Similar results were found for Jack-In-the-Box where current print advertising is a more important factor in explaining current sales than past print advertising expenditures. Both these results indicate that there is an absence of a "goodwill" effect for McDonald's and Jack-In-the-Box with regard to their electronic and print advertising expenditures, respectively.

Findings from the current study also have important implications for communications policy with respect to QSR firm advertising. Advertising practices of QSR firms has increasingly become a controversial topic with regard to issues of obesity, and has gained importance on the public policy agenda in the United States. Recent reports by the National Center for Health Statistics (2008) indicate that approximately two-thirds or 66.3 percent of all Americans (over 18 years of age) are overweight and 32 percent of Americans over 20 years of age are obese. In addition, research suggests that the rate of obesity in the U.S. is on the rise (Flegal et al., 2002); at the current rate of obesity, approximately 40 percent of all American adults will be obese by 2010 (Hellmich, 2003).

With the increase in obesity rates in the United States, fast-food advertising has faced a significant amount of criticism. On one hand, food marketers assert that food

advertising is not to blame for the increase of obesity rates; arguing that food advertising does not increase total purchases, rather advertising rearranges the marketshare by inducing brand switching (Young, 2003). On the other hand, findings from several studies suggest the influence of advertising on obesity. For example, Lee and Tseng (2005) conducted a content analysis on primetime television commercials on four major U.S. networks (ABC, CBS, NBC and FOX) to assess the general characteristics and actual nutritional content (ANC) of advertised foods. Results from this study suggest that food products advertised during primetime tend to be unhealthy based on their ANC. The authors also noted that fast food restaurants had the highest frequency in terms of advertisement frequency. The results were consistent with past research that found a majority of commercials during peak television viewing, such as prime-time, promote non-nutritious or unhealthy foods (Kotz and Story, 1994; Kuribayashi et al., 2001; and Lee, Tseng and Choi, 2004). Others such as Harrison and Marske (2005) found that food and beverages advertisements provided consumption cues to audiences such as images of attractive models eating, snacking at non-meal times, and emotional appeals. In another study, Conor (2006) found that the majority of food advertisements that targeted preschool children were from fast-food restaurants and sweetened cereals. Results from a controlled experiment conducted by Halford, Boyland, Hughes, Stacey, McKean, and Dovey (2008) showed that children viewing food advertisements ate larger portions of snack foods than children who watched nonfood advertisements. These authors also noted that the reported effect was greater for obese children in the study. In addition, the increased usage of digital media such as cell phones, mobile music devices, broadband

video, instant messaging, videogames, and so on, extend the "marketing ecosystem" for food advertisers (Chester and Montgomery, 2007; and Singer, 2009). Researchers, such as Chester and Montgomery (2009) and Singer (2009) assert that the influence of marketing communications on food consumption is likely to increase in the future.

Results from the current study found that aggregate advertising expenditures and aggregate sales revenues for the QSR industry in the United States were significantly and positively related from 1986 to 2007. This is the first study to examine this relationship over such an extended period of time, namely twenty-two years. In addition, results from the brand level analysis showed a positive and significant relationship between advertising expenditures and sales revenues for several QSR brands in the present study.

It is important to bear in mind that advertising expenditures is one of the variables that has a positive relationship with the increase in QSR consumption in the United States during the past two decades. Undoubtedly, a number of factors such as: QSR firm outlets, demographic factors such as the size of women in the workforce, sedentary lifestyles, cultural norms, lack of health information, limited access to healthy foods, and changing attitudes towards QSR or fast foods undoubtedly may have an impact on consumption of QSR brands. These factors were not included in the analysis due to the lack of continuous and reliable observations over the observed time period. One should also note that the relationships observed in this study are correlational and not causal. It is possible, that in many cases, that sales "cause" advertising expenditures. Often, advertising budgets are set as a percentage of past sales or anticipated sales (Patti and Blasko, 1981). That is,

advertising may show a positive effect on sales, but on the other the opposite may also be true i.e. sales have a positive and significant effect on advertising.

Overall, this study contributes to the above discussion by providing findings that show advertising expenditures is one of the factors that have a significant and positive relationship with sales revenues for the overall QSR industry as well as for several QSR firms in the U.S. from 1986 to 2007. These results imply an opportunity for QSR firms to engage in Corporate Social Responsibility (CSR) initiatives to help promote and influence healthier eating choices among its constituents. Specifically, as advertising expenditures have demonstrated a positive and significant relationship with sales revenues for QSRs, this suggests that advertising may be the best messenger to target audiences with messages regarding healthful eating. Additionally, health bodies and policy makers may be best suited to partner with QSR firms to increase the effectiveness of communicating healthy eating messages to audiences.

Limitations and Directions for Future Research

There are several limitations present in the current study which provide opportunities and directions for future research. A potential limitation in the current study is the use of national annual data for the advertising expenditures and sales variables. Saffer (1996) contends that national data on an annual level has a high level of aggregation, and thus shows little change on a year to year basis. The author argues that due to this it is less likely to find an effect on consumption (sales). However, others such

as Bass and Leone (1983) state that the longer the length of the data interval, the higher the magnitude of advertising coefficients.

The sample of QSR firms used in the study is a potential limitation. Although this study uses a valid sample, representing major companies in the QSR industry, a sample including privately held firms as well as mid to small sized firms would provide a more comprehensive analysis of the QSR market. The current study is limited in this regard due to the lack of access to this information. Privately held companies limit public access to such information. Due to the lack of consistent and reliable observations over a twenty-two year span many firms could not be included in the current study.

Another variable of interest which was not included in the present study is the number of firm outlets. Because QSR demand is likely to be driven by its proximity to potential customers, gaining access to such data and incorporating it as an independent variable will greatly enhance the results. It may be important to consider the relationship between outdoor advertising expenditures and the number of QSR firm outlets. It is possible that these two variables are closely related because outdoor advertising, such as billboards, are typically placed in locations where firm outlets exist.

Furthermore, although the current study incorporates the CPI for FAFH, a measure which provides the average price (including promotions) of food items purchased outside of home, a more accurate measure of promotions can help provide a fuller picture of the relationship between advertising and sales in the QSR market.

However, due to the lack of a reliable and consistent measure for these variables, the current study does not incorporate these factors into the analysis.

This study examines total advertising expenditures of QSR firms by medium and does not take into account the creative appeals used by firms. Creative appeals and execution elements can play an important role by interacting with the expenditure levels to result in effective advertising. Because no accepted variable capturing such elements exist, it is impossible to include such interaction effects in the current study. Future research should examine means by which creative appeals can be included into such analysis.

In examining the relationship between advertising and sales of QSR firms the issue of "efficiency" becomes an important consideration. The next step for further research in this area should focus on the efficiency of advertising in this industry. Specifically: 1) How efficient is brand advertising in the U.S. QSR industry? And, 2) What is the efficiency of advertising in three media types: electronic, print and billboard in the U.S. QSR industry? Efficiency is defined in the advertising realm as the ratio between advertising expenditures and sales (Cheong and Leckenby, 2006). Commonly used by management scientists, Data Envelopment Analysis or DEA is a linear programming formulation which can be used to assess the relative efficiency of advertising. Based on economic principles, DEA is a nonparametric method of evaluating the relative efficiency of individual units within a given population. These "units" are known as Decision Making Units or DMU's. For example, DEA can be used to define

the nonparametric relationship between various media spending inputs such as Print, Electronic and Billboard and outputs such as Sales. Recent developments in DEA in advertising research (Seiford and Zhu, 1999; Chatzoglou and Soteriou, 1999; Luo and Donthu, 2001) can be applied to the data in the present study in order to indentify best practices and efficiency in each media choice within the QSR market. Together with the present analysis, results from such tests will not only build a fuller understanding of the relationship of the advertising—sales relationship within the QSR category, but will also provide a cohesive picture to advertising and sales relationship in general.

Overall, this study provided analysis of the advertising and sales relationship in a prominent U.S. industry, namely in the QSR industry from 1986 to 2007. Analyses from aggregate level data suggest that advertising may be a factor in explaining sales. Additionally, results from brand level data imply a positive relationship between brand advertising expenditures and sales revenues for certain QSR brands. This study makes contributions to the literature by providing analysis on an important industry which has not been studied previously. It also extends the literature by examining a growing market, as previous research has largely looked at declining or mature markets. This study also provides insight to advertising practitioners by quantitatively analyzing the relationship between advertising expenditures and sales revenues over the past 22 years in the QSR industry. Furthermore, several areas that need to be addressed in future research are also identified.

APPENDICES

APPENDIX A: PLOTS FOR AGGREGATE LEVEL DATA

APPENDIX A: PLOTS FOR AGGREGATE LEVEL DATA

VISUAL INFORMATION: AGGREGATE PLOTS

Figure 1: Aggregate Sales for QSR in the United States 1986—2007

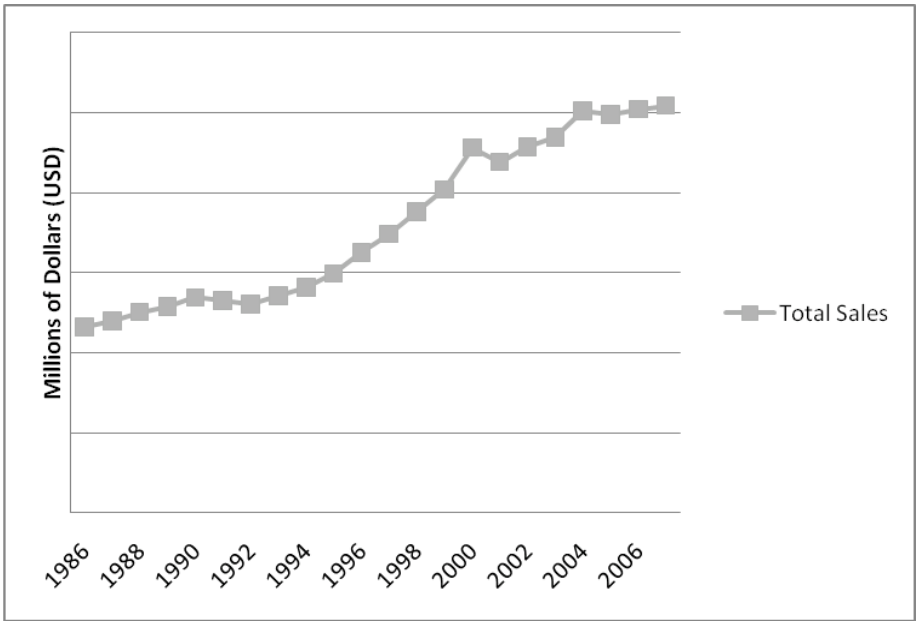


Figure 2: Aggregate Advertising Expenditures for QSR in the United States 1986—2007

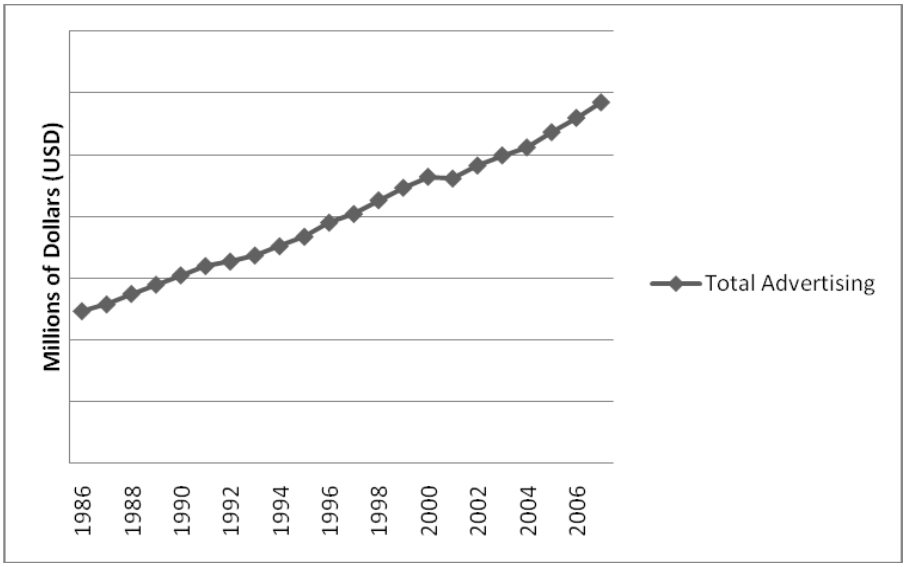


Figure 3: Aggregate Advertising Expenditures and Sales for QSR Firms in the United States 1986—2007

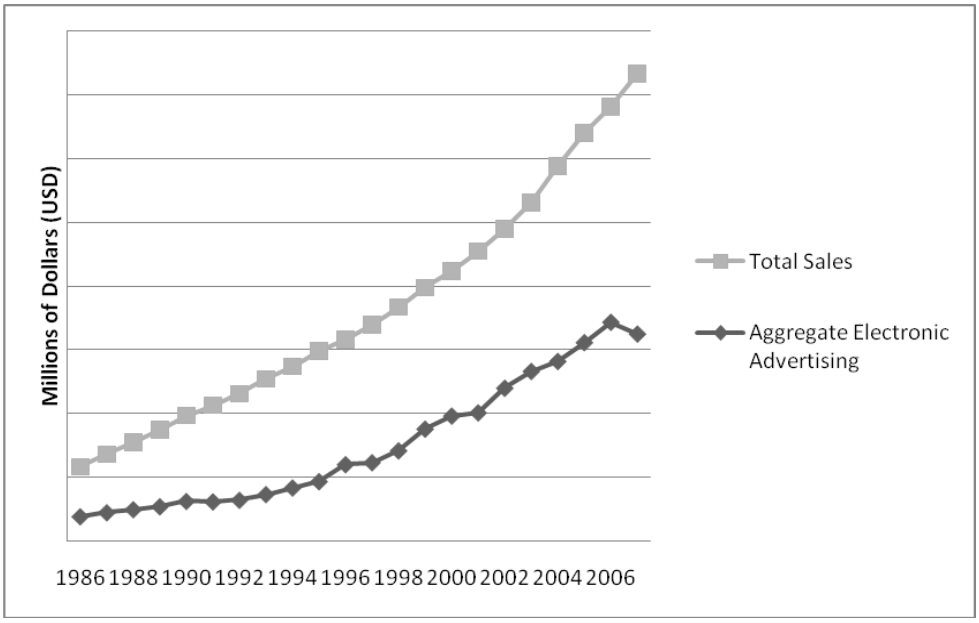


Figure 4: Aggregate Advertising Electronic Expenditures and Sales in the United States 1986—2007

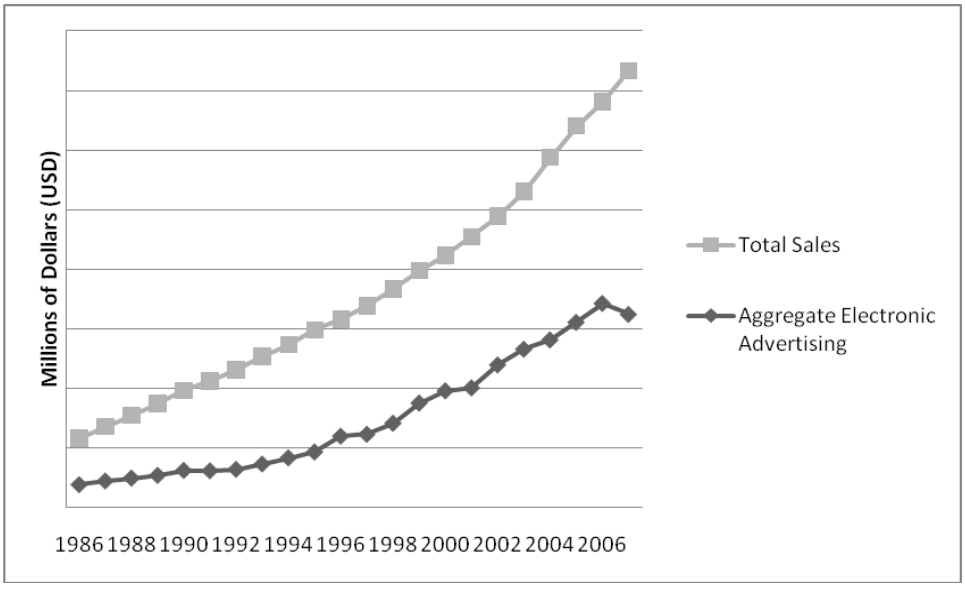


Figure 5: Aggregate Advertising Print Expenditures and Sales in the United States 1986—2007

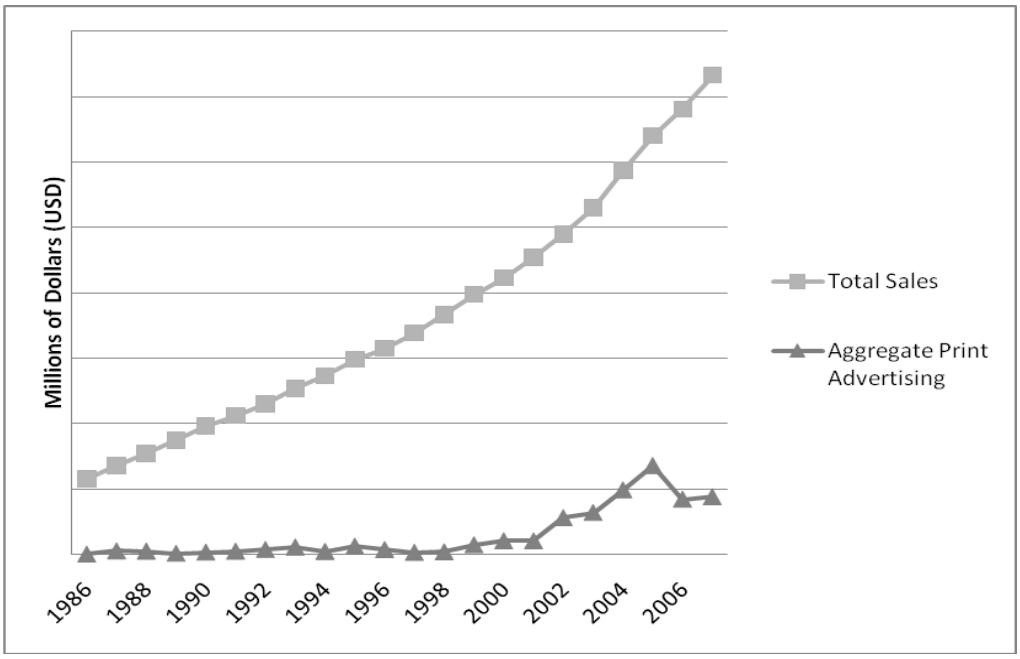
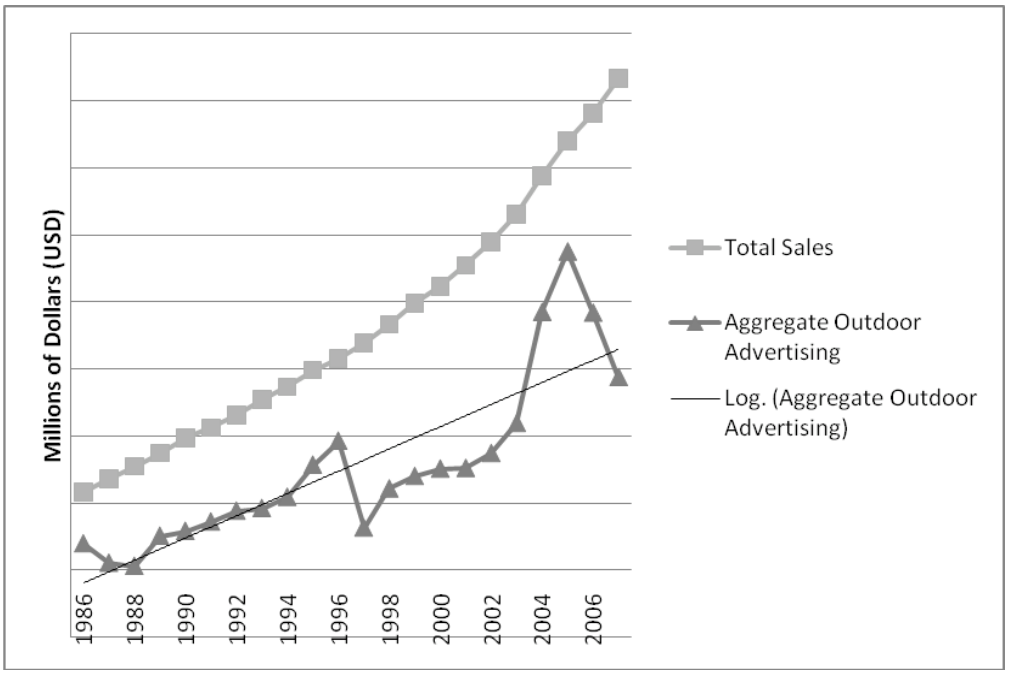


Figure 6: Aggregate Advertising Outdoor Expenditures and Sales in the United States 1986—2007



APPENDIX B: PLOTS FOR BRAND LEVEL DATA

VISUAL INFORMATION: BRAND PLOTS

Figure 1: McDonald's Total Advertising Expenditures and Sales in the United States 1986—2007

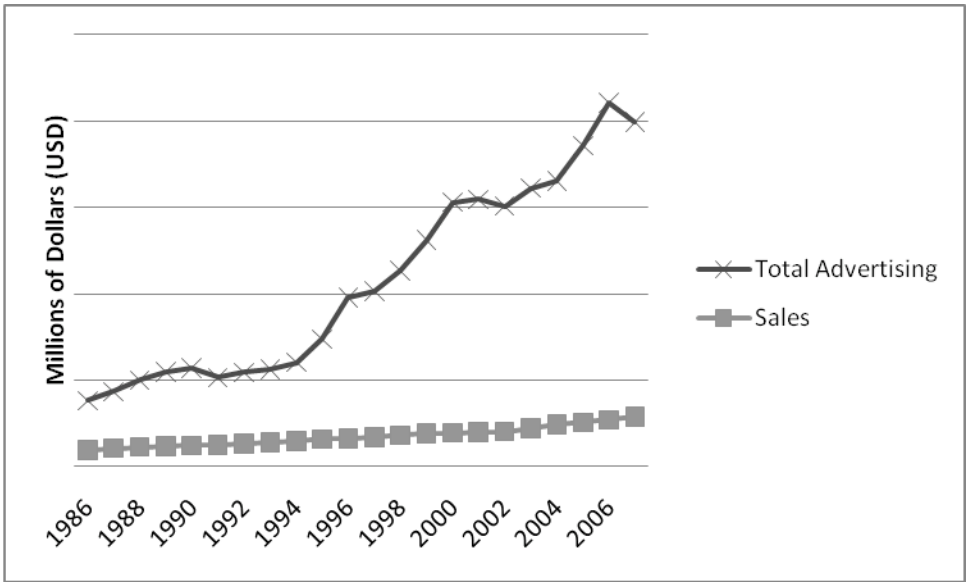


Figure 2: McDonald's Advertising Expenditures by Media and Sales in the United States 1986—2007

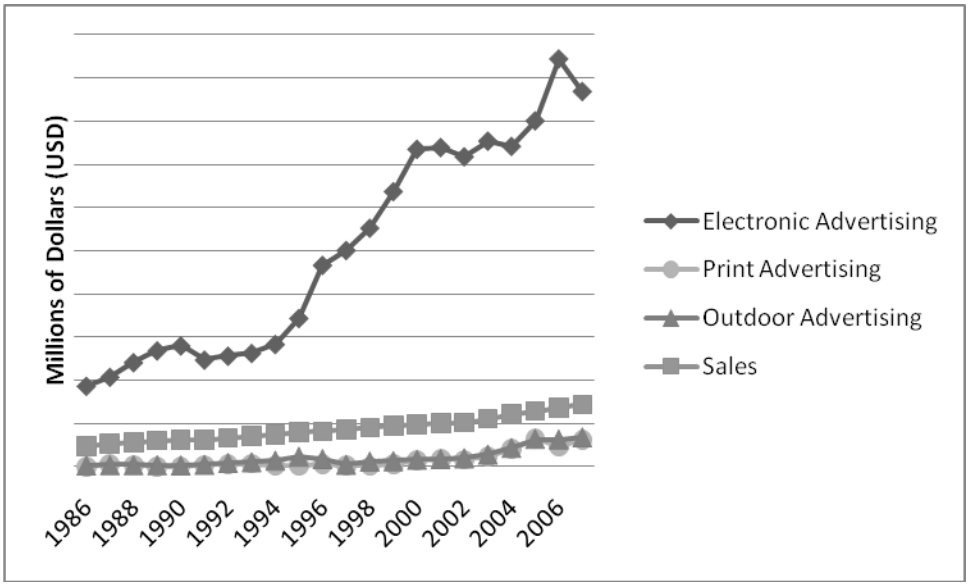


Figure 3: Subway Total Advertising Expenditures and Sales in the United States 1986—2007

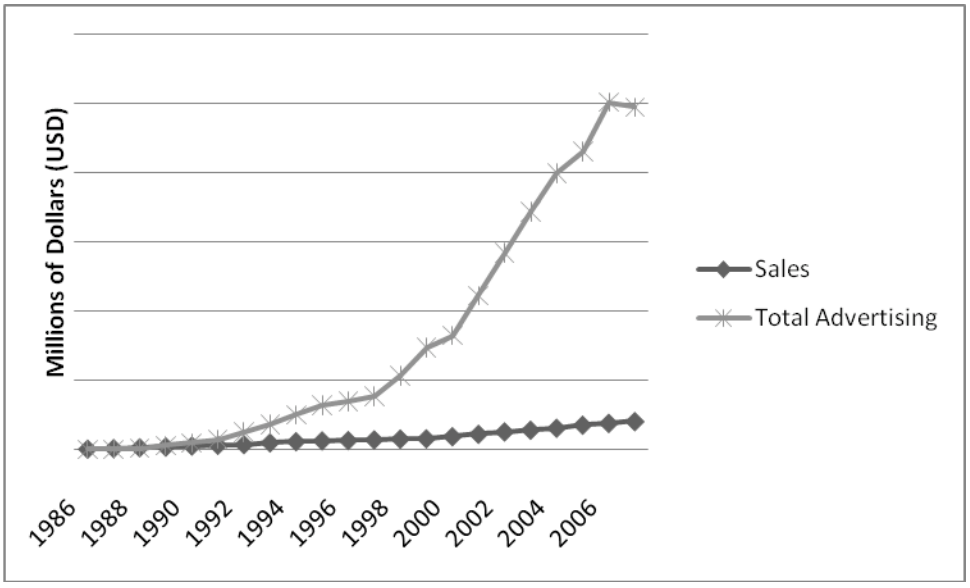


Figure 4: Subway Advertising Expenditures by Media and Sales in the United States 1986—2007

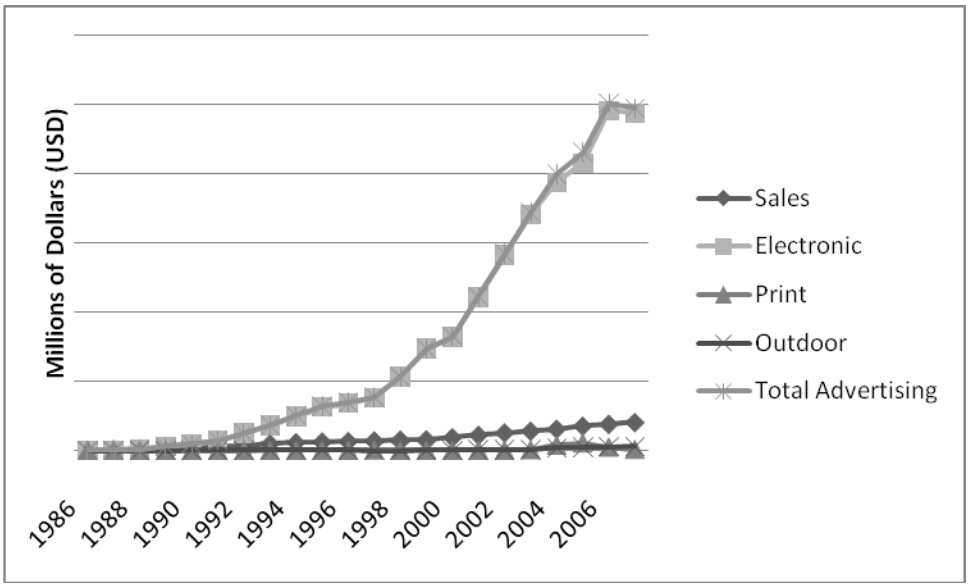


Figure 5: Jack-in-the-Box Total Advertising Expenditures and Sales in the United States 1986—2007

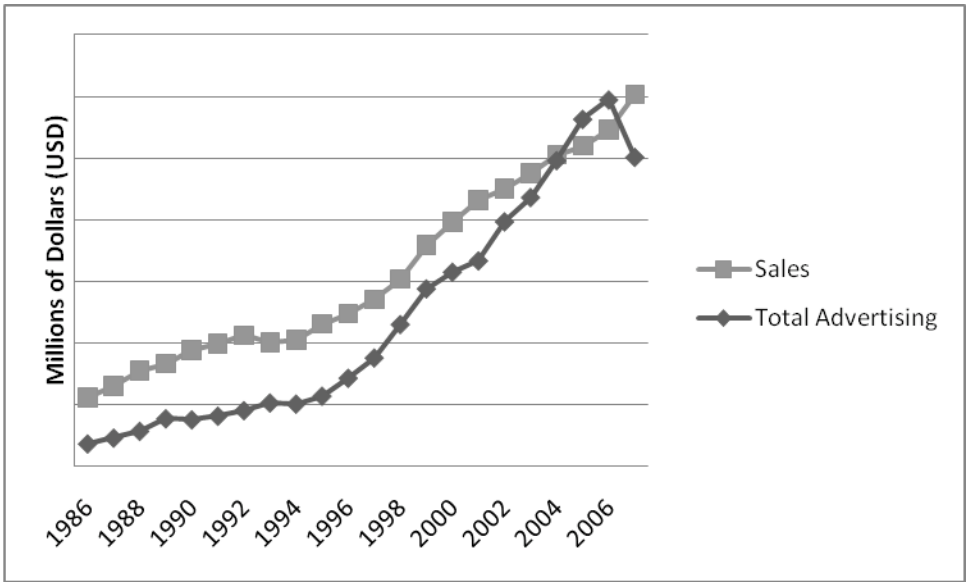


Figure 6: Jack-in-the-Box Advertising Expenditures by Media and Sales in the United States 1986—2007

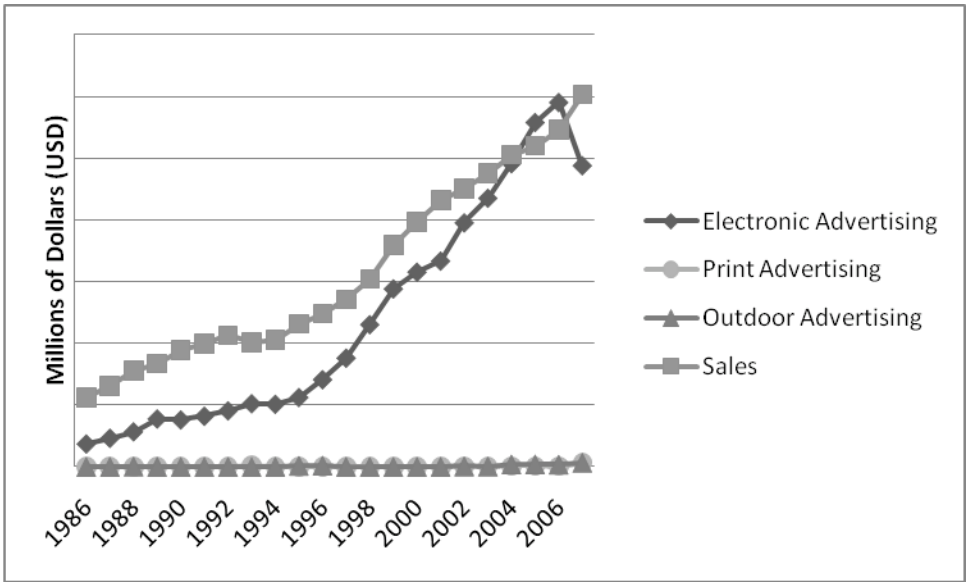


Figure 7: KFC Total Advertising Expenditures and Sales in the United States 1986—2007

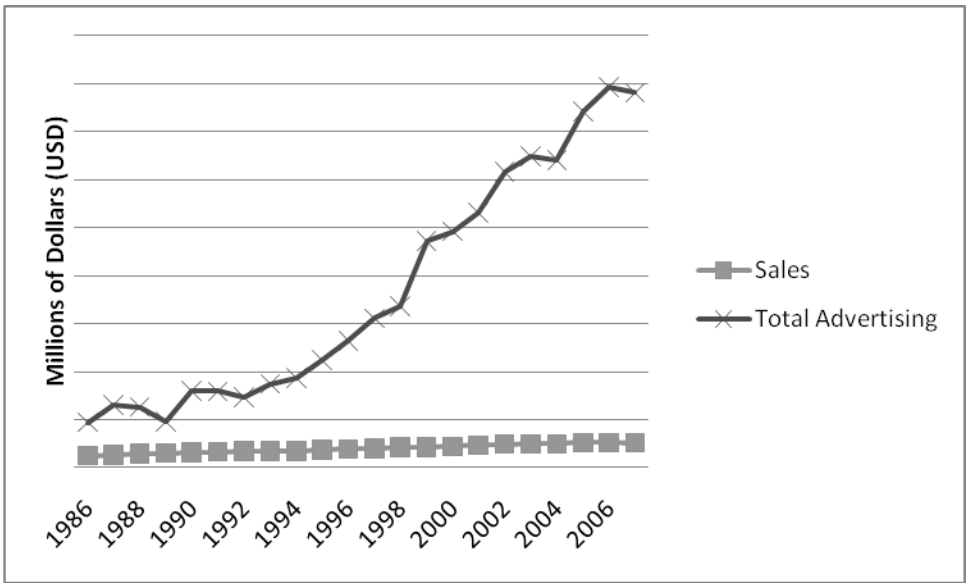


Figure 8: KFC Advertising Expenditures by Media and Sales in the United States 1986—2007

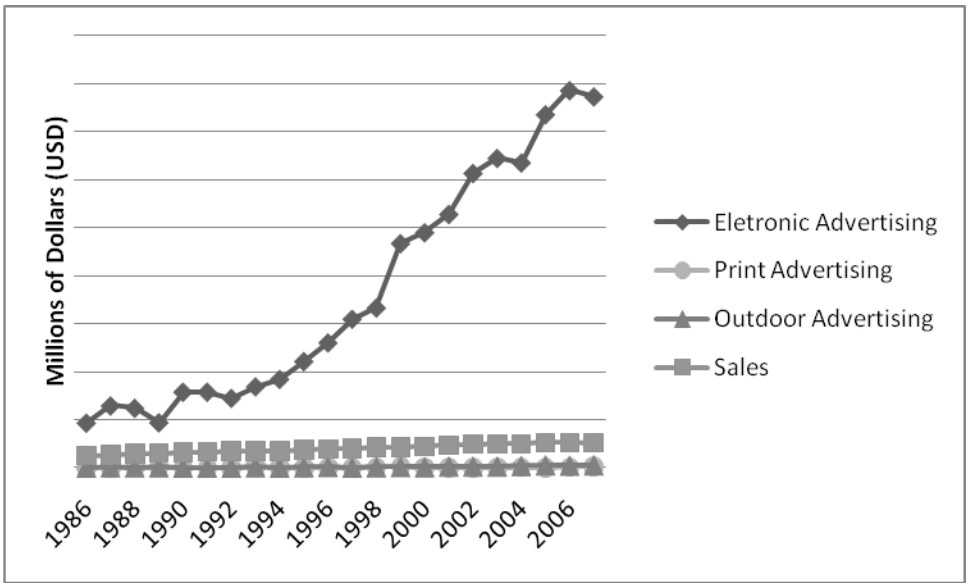


Figure 9: TacoBell Total Advertising Expenditures and Sales in the United States 1986—2007

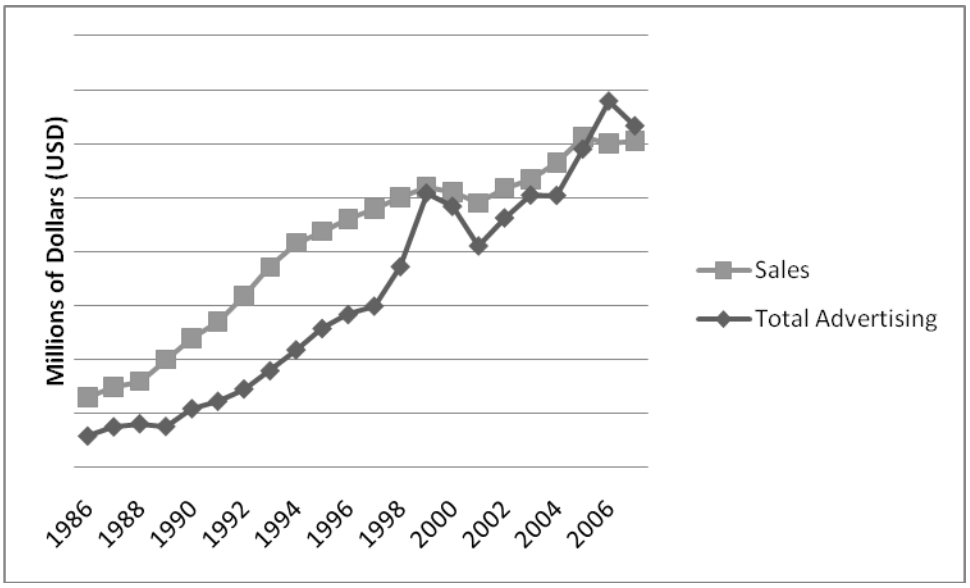


Figure 10: TacoBell Advertising Expenditures by Media and Sales in the United States 1986—2007

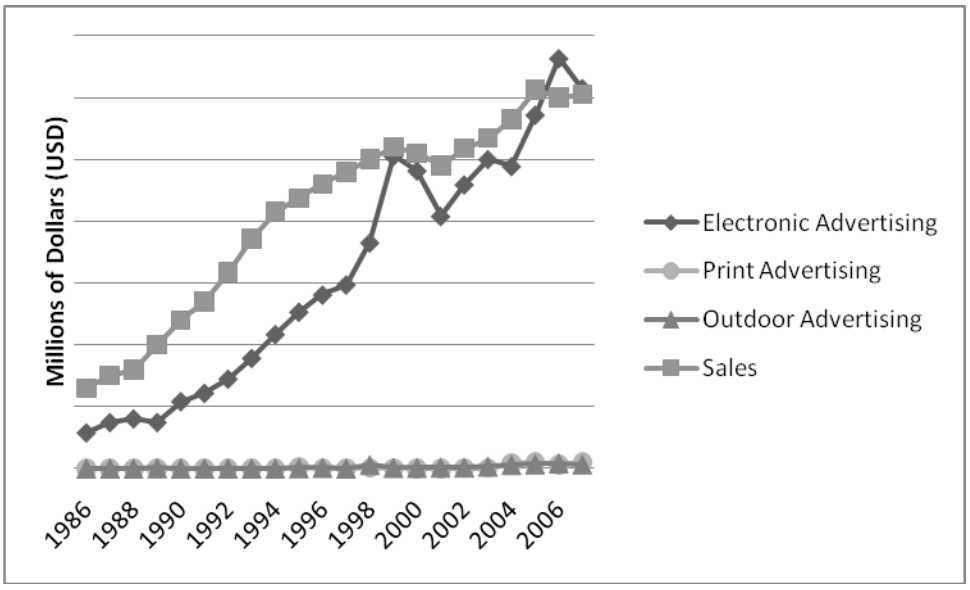


Figure 11: Sonic Total Advertising Expenditures and Sales in the United States 1986—2007

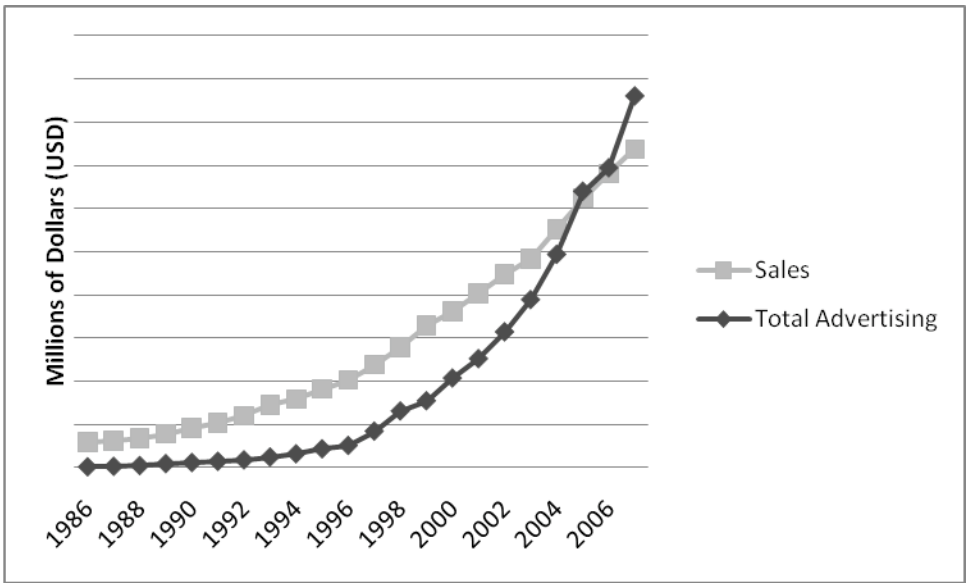


Figure 12: Sonic Advertising Expenditures by Media and Sales in the United States 1986—2007

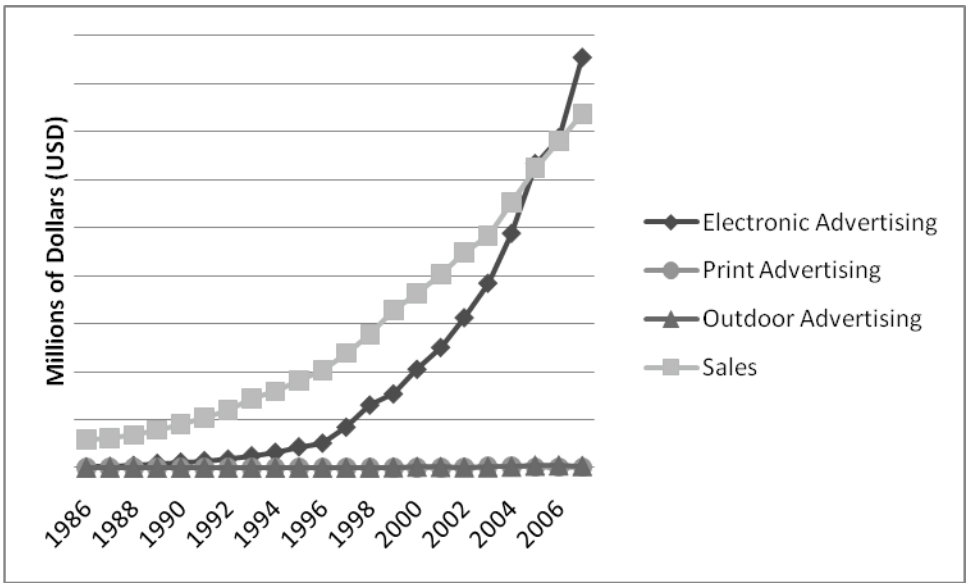


Figure 13: Wendy's Total Advertising Expenditures and Sales in the United States 1986—2007

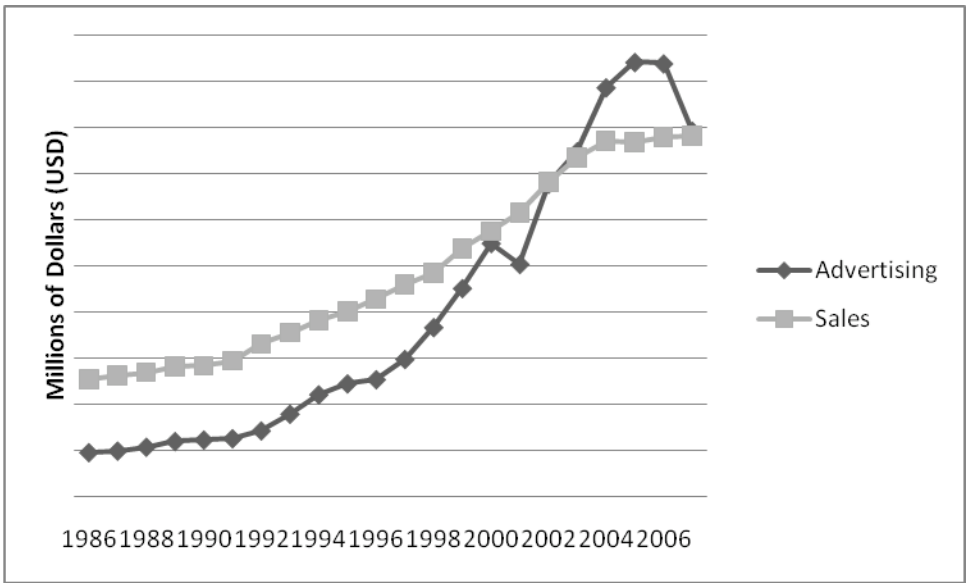


Figure 14: Wendy's Advertising Expenditures by Media and Sales in the United States 1986—2007

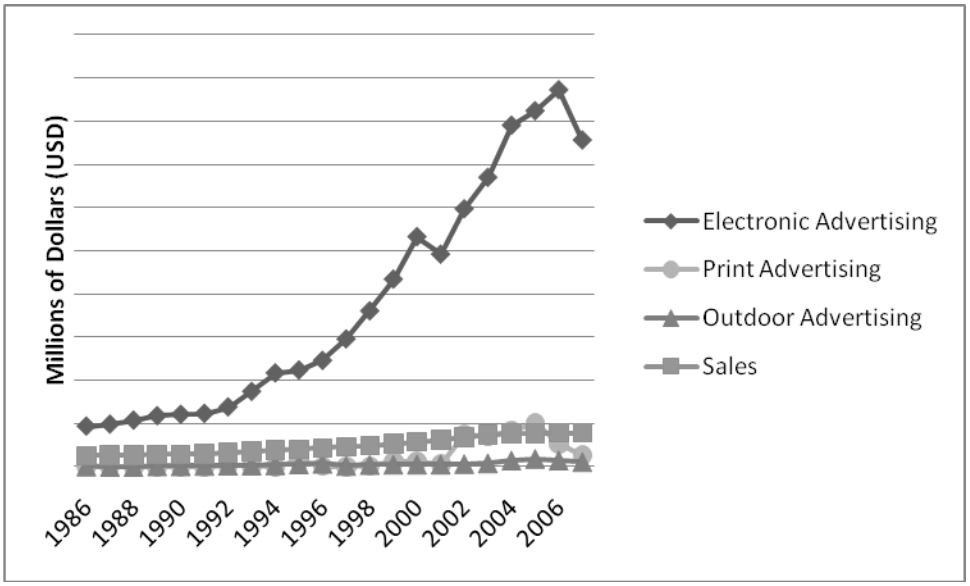


Figure 15: PizzaHut Total Advertising Expenditures and Sales in the United States 1986—2007

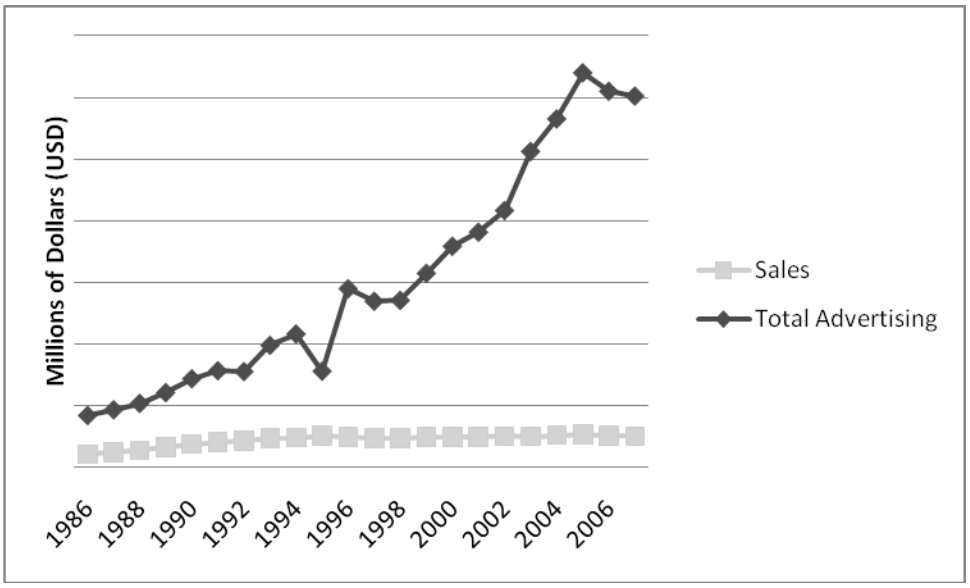


Figure 16: PizzaHut Advertising Expenditures by Media and Sales in the United States 1986—2007

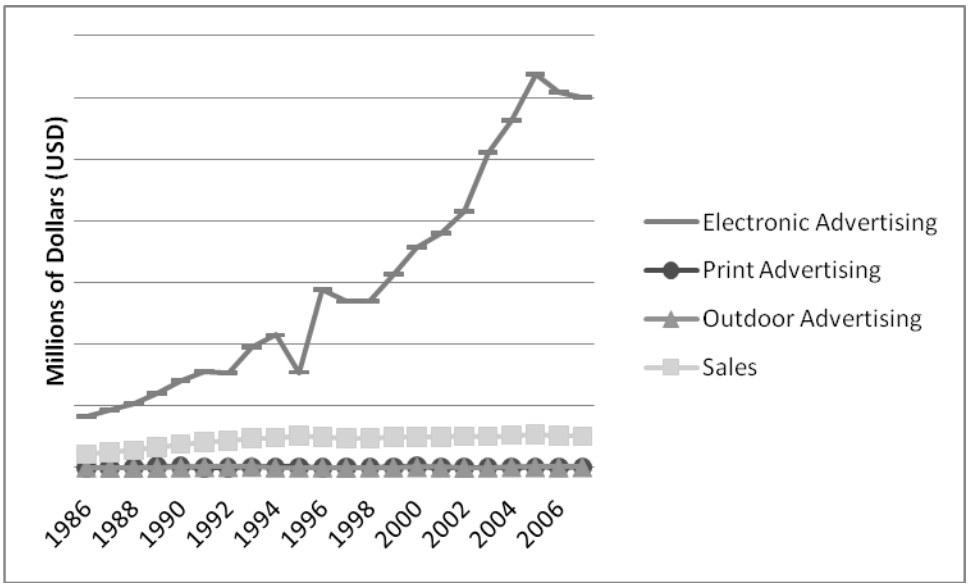


Figure 17: Domino's Total Advertising Expenditures and Sales in the United States 1986—2007

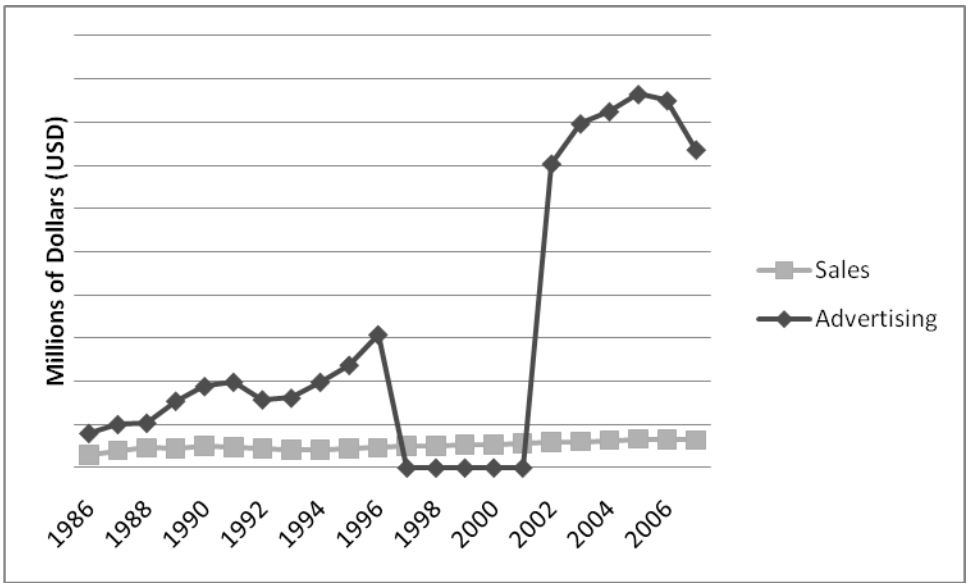
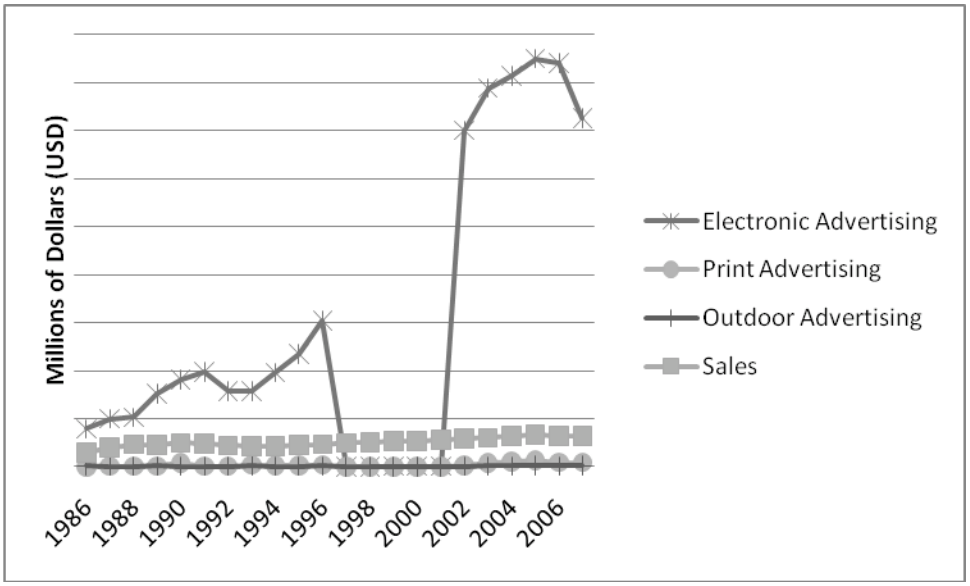


Figure 18: Domino's Advertising Expenditures by Media and Sales in the United States 1986—2007



APPENDIX C: PLOTS FOR BRAND MARKET SHARE DATA

VISUAL INFORMATION: BRAND MARKETSHARE PLOTS

Figure 1: McDonald's Brand Marketshare in the United States 1986—2007

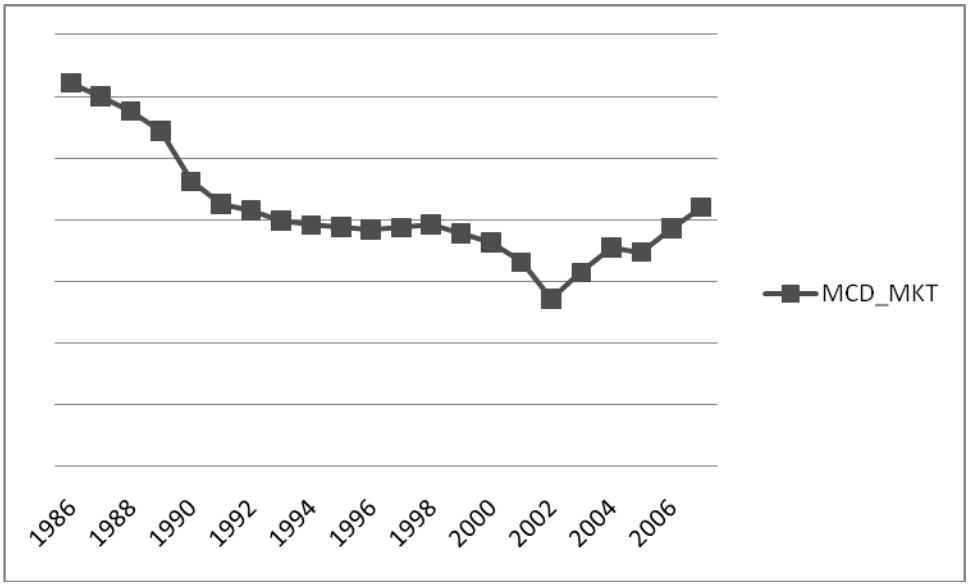


Figure 2: McDonald's Advertising Expenditures by Media in the United States 1986—2007

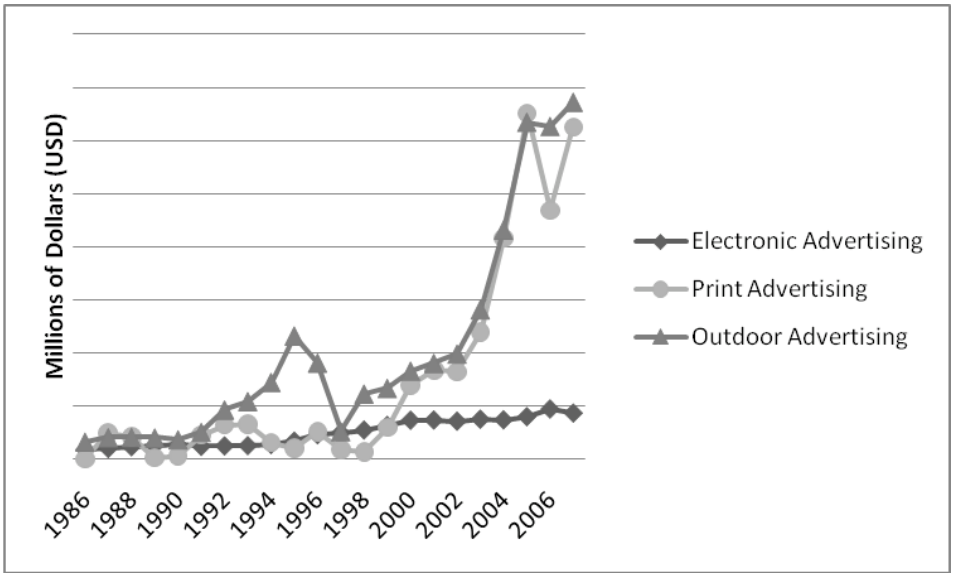


Figure 3: Subway Brand Marketshare in the United States 1986—2007

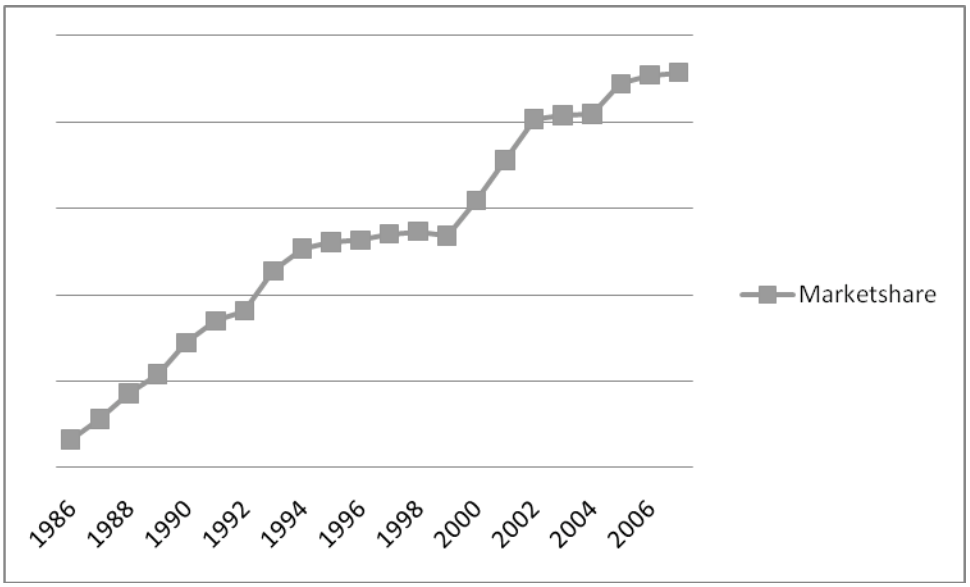


Figure 4: Subway Advertising Expenditures by Media in the United States 1986—2007

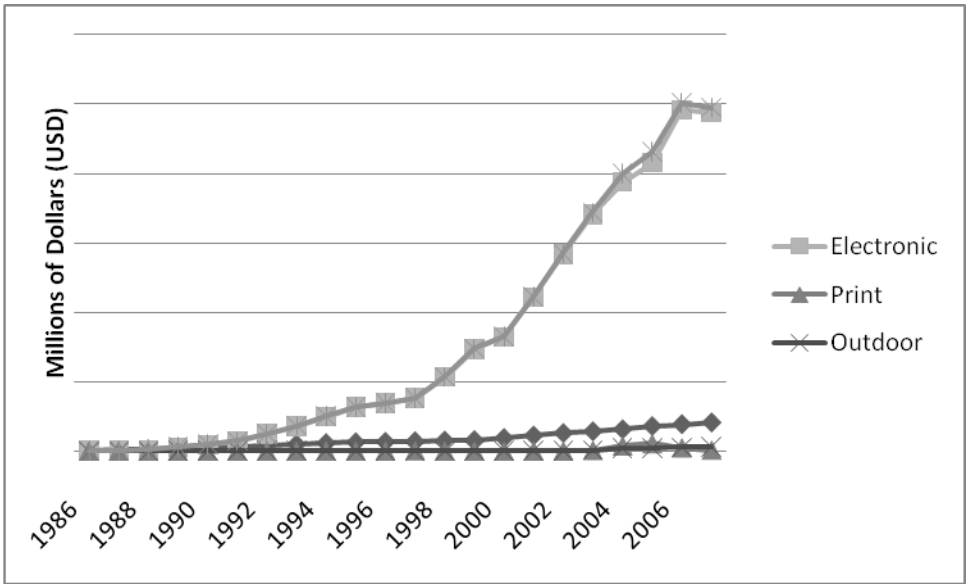


Figure 5: Jack-in-the-Box Marketshare in the United States 1986—2007

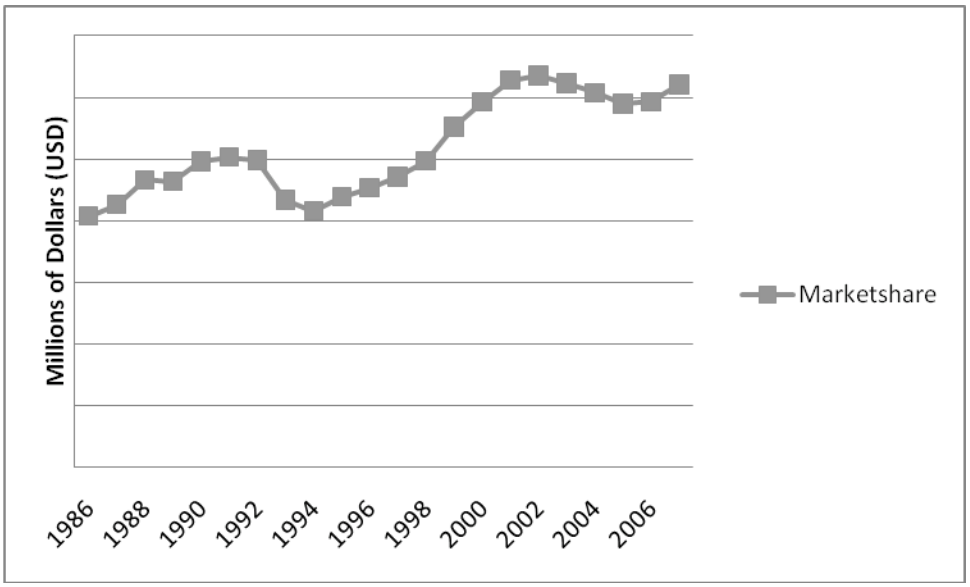


Figure 6: Jack-in-the-Box Advertising Expenditures by Media in the United States 1986—2007

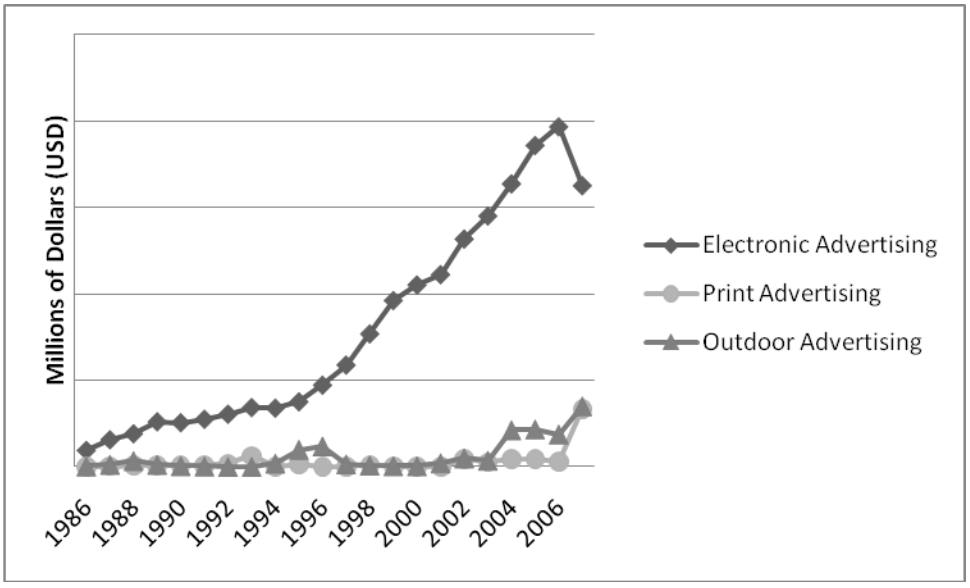


Figure 7: KFC Brand Marketshare in the United States 1986—2007

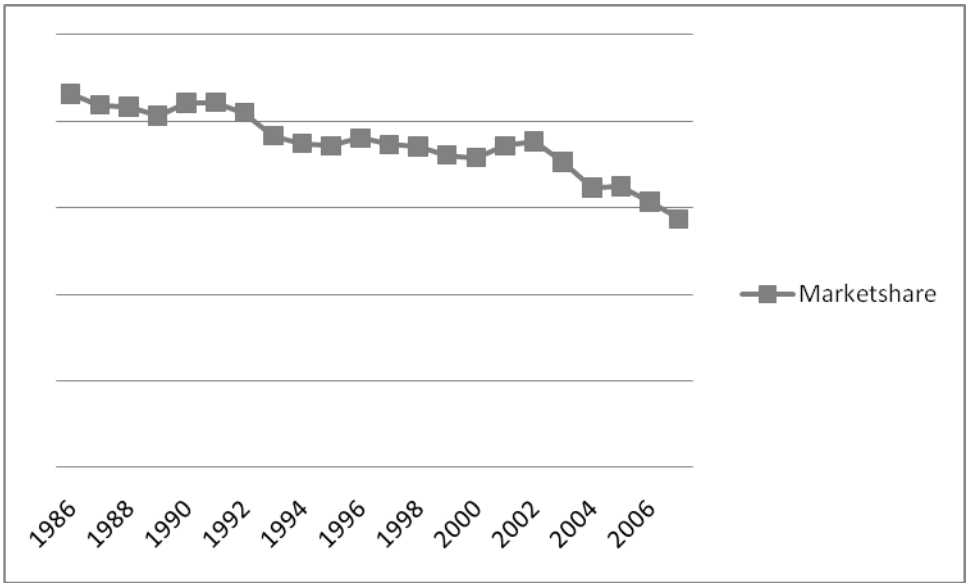


Figure 8: KFC Advertising Expenditures by Media in the United States 1986—2007

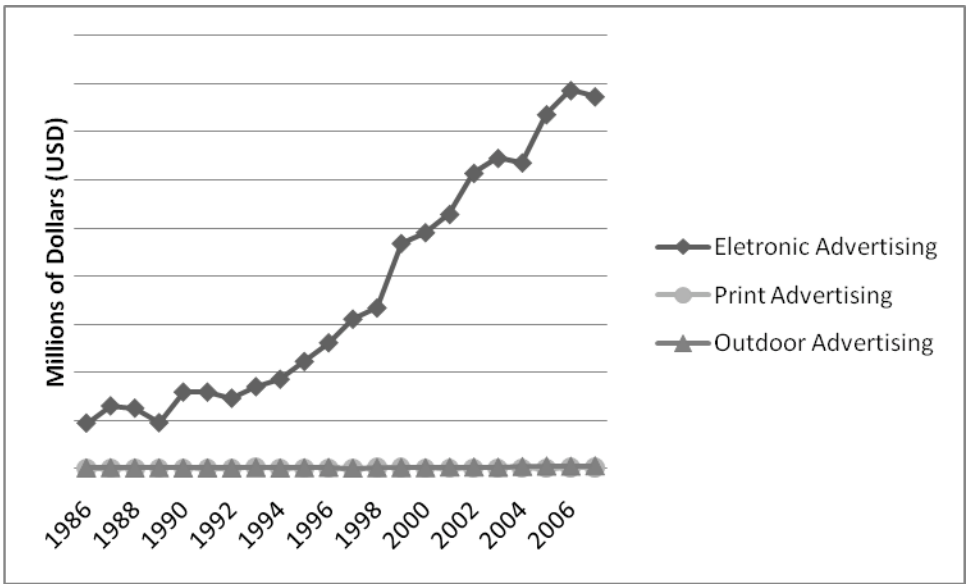


Figure 9: TacoBell Brand Marketshare in the United States 1986—2007

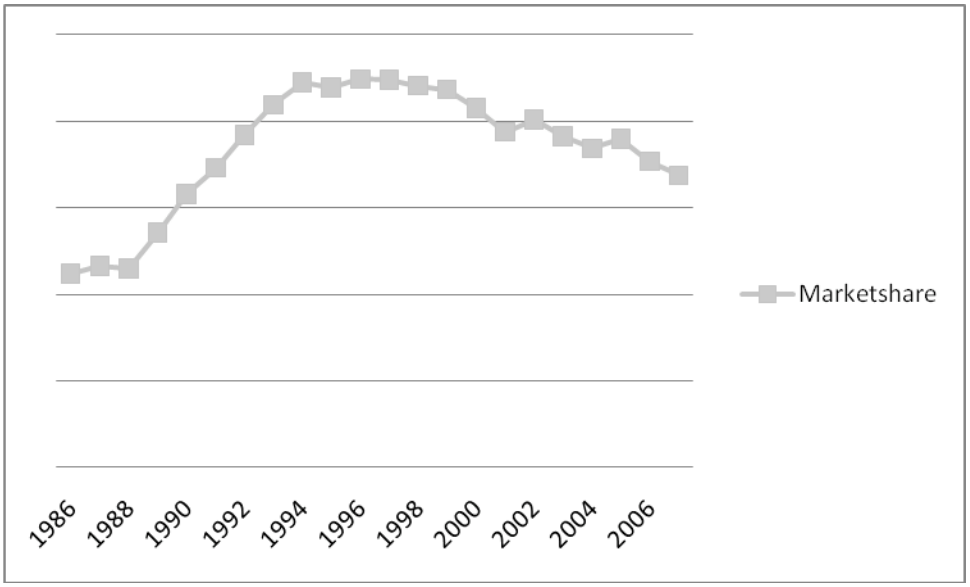


Figure 10: TacoBell Advertising Expenditures by Media in the United States 1986—2007

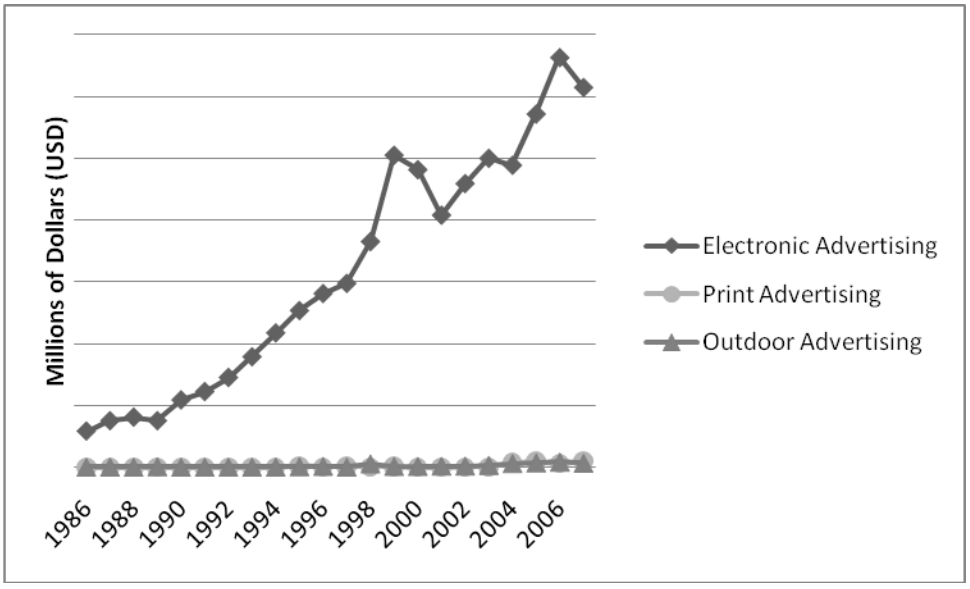


Figure 11: Sonic Brand Marketshare in the United States 1986—2007

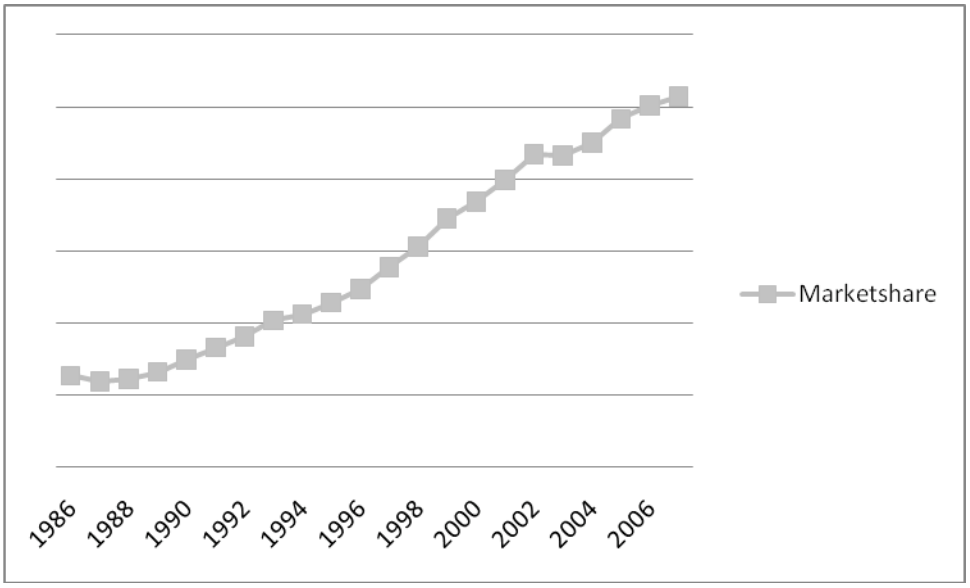


Figure 12: Sonic Advertising Expenditures by Media in the United States 1986—2007

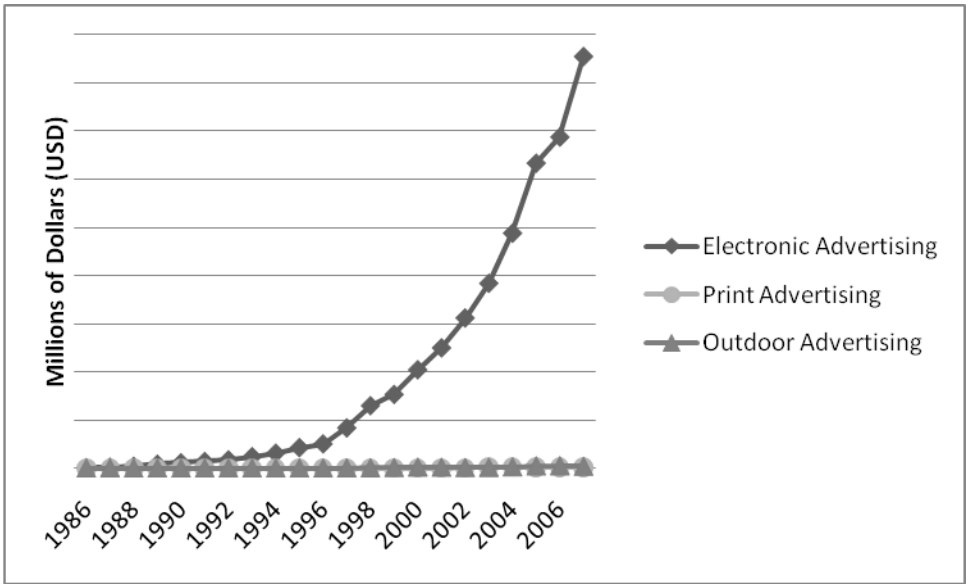


Figure 13: Wendy's Brand Marketshare in the United States 1986—2007

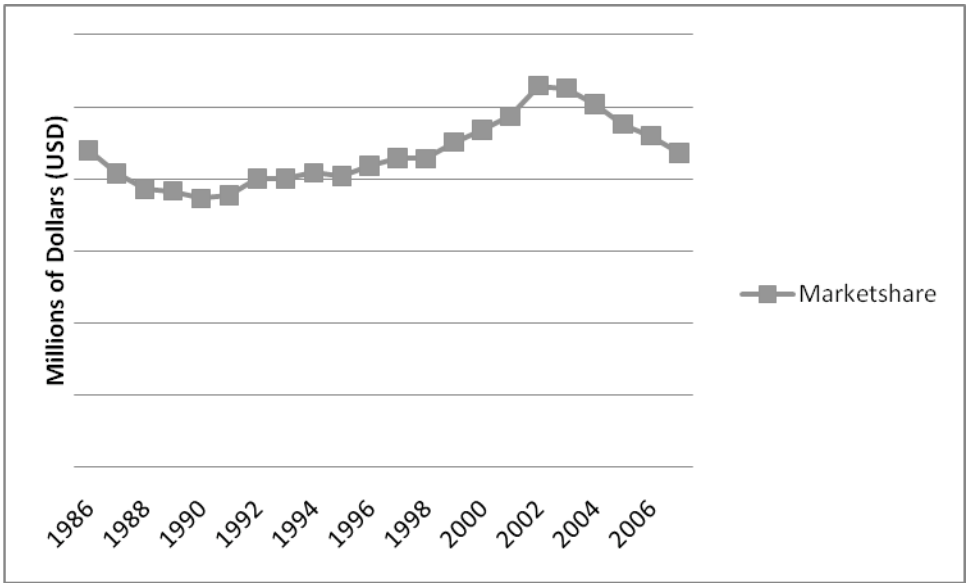


Figure 14: Wendy's Advertising Expenditures by Media and Marketshare in the United States 1986—2007

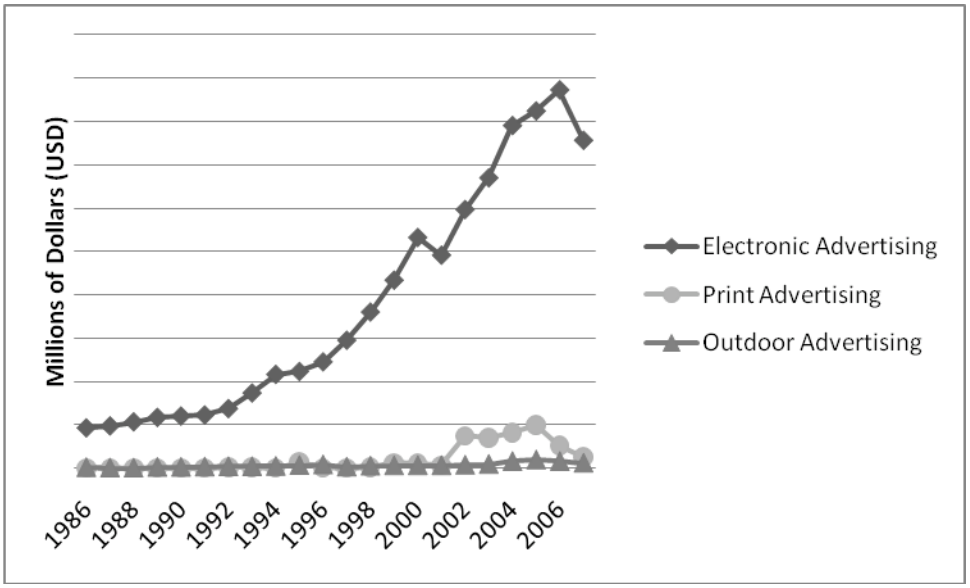


Figure 15: PizzaHut Brand Marketshare in the United States 1986—2007

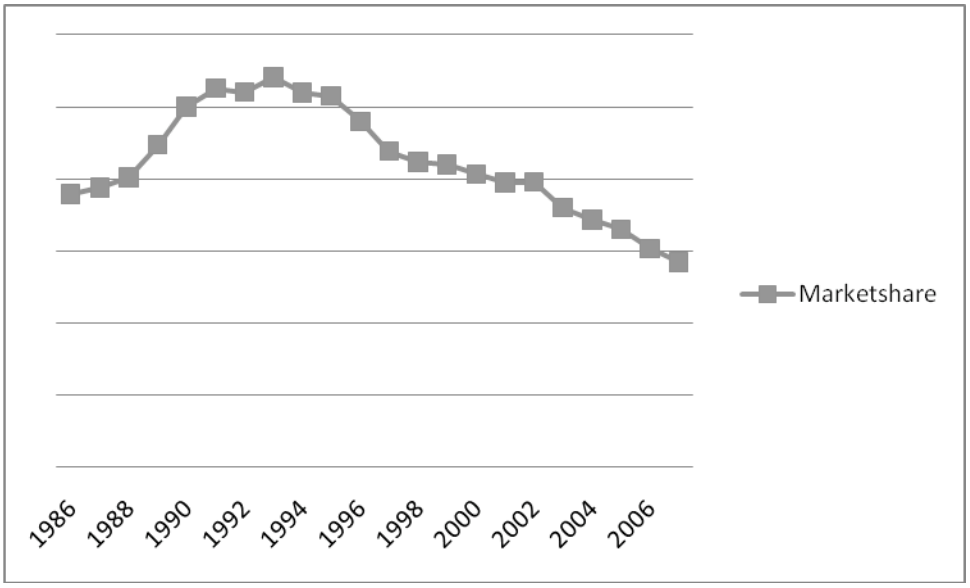


Figure 16: PizzaHut Advertising Expenditures by Media in the United States 1986—2007

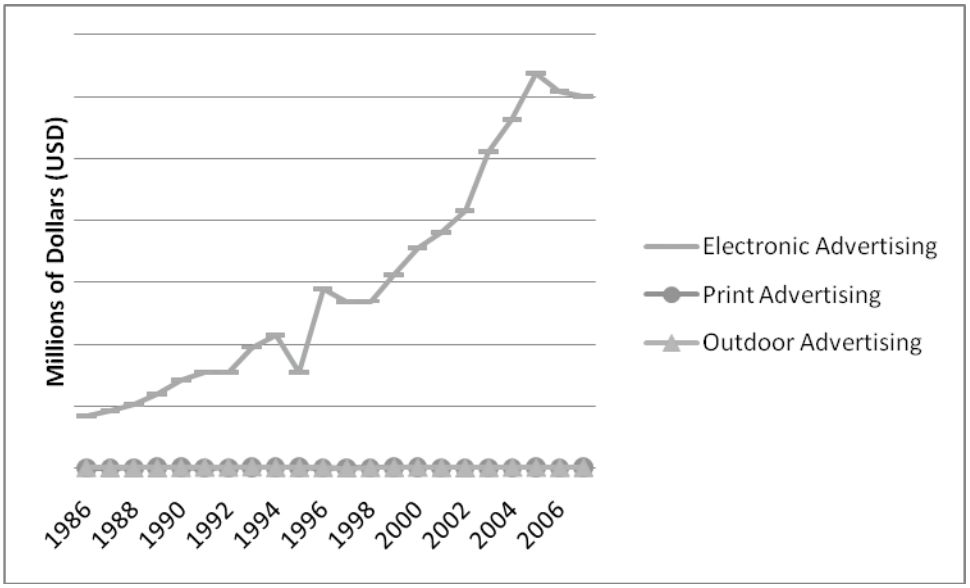


Figure 17: Domino's Brand Marketshare in the United States 1986—2007

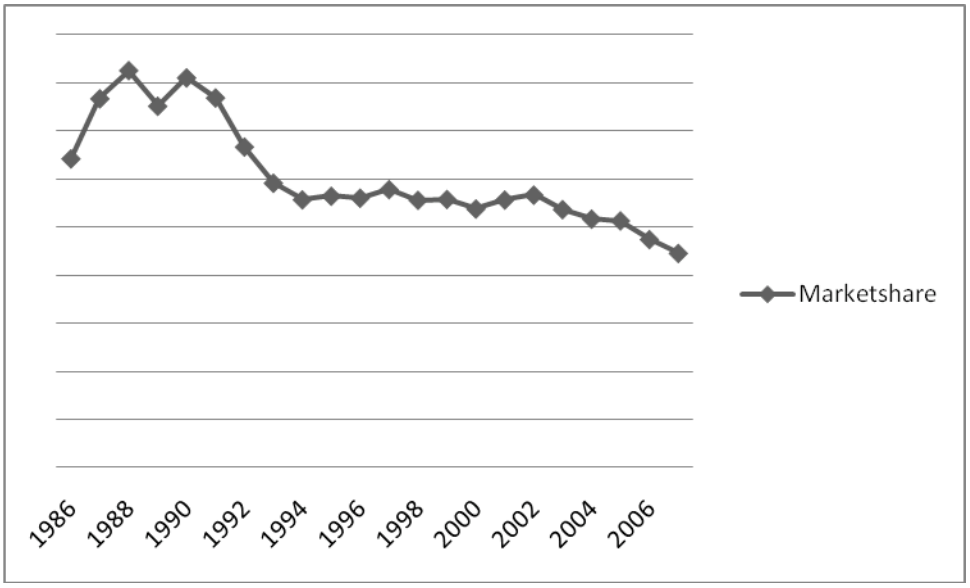
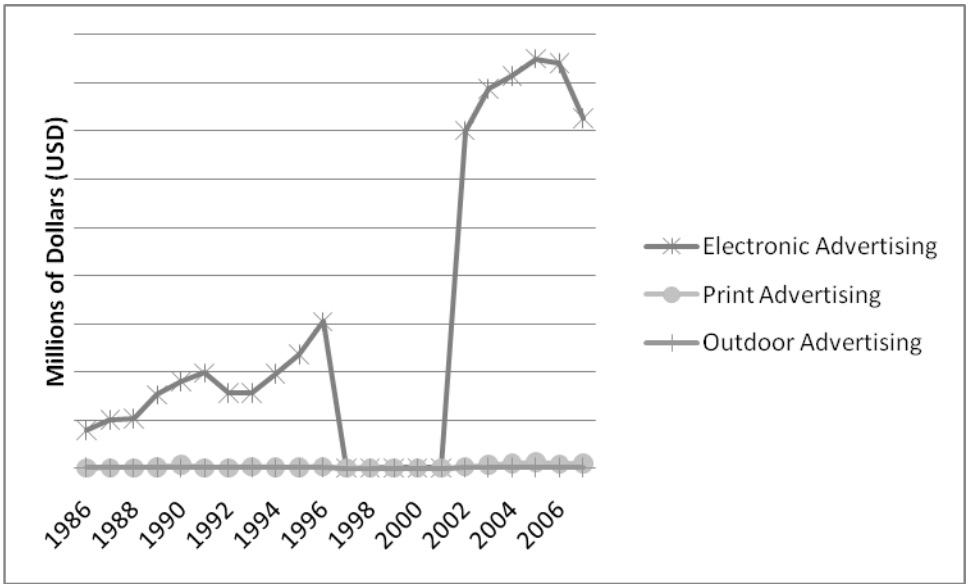


Figure 18: Domino's Advertising Expenditures by Media in the United States 1986—2007



BIBLIOGRAPHY

BIBLIOGRAPHY

Aaker, David A., and Day, George, S. (1974) A Dynamic Model of Relationships Among Advertising, Consumer Awareness, Attitudes, and Behavior, *Journal of Applied Psychology*, 59, 281-6.

Aaker, David A., Batra, Rajeev and Myers, John G. (1992) *Advertising Management*, 4th ed. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Aaker, David A.; Carman, James M.; and Jacobson, Robert. (1982) Modeling Advertising-Sales Relationships Involving Feedback: A Time Series Analysis of Six Cereal Brands. *Journal of Marketing Research* 19 (February), 116-125.

ABC News-Time Poll, May 30, 2008. Retrieved online at: http://www.abcnews.go.com/images/pdf/954a1ObesityinAmerica.pdf

Abernethy, Avery M., and Teel, Jesse E. (1986) Advertising Regulation's Effect upon Demand for Cigarettes, *Journal of Advertising*, 15 (4), 51–55.

AdAge.com (2008), "Total U.S. Measured Advertising Spending by Category," Available at: http://adage.com/datacenter/datapopup.php?article_id=127914 .

Advertising Age, (2005), "#1 Subway," 76 (2), 16.

Adweek, (1997). Creative best spots June. Vol. 38, Issue 28.

Alemson, M. A. (1970), "Advertising and the Nature of Competition in Oligopoly Over Time: A Case Study," The Economic Journal, 80, 282-306.

Ali Shah, Syed Zulfiqar and Akbar, Saeed, (2008).Value Relevance of Advertising Expenditure: A Review of the Literature. *International Journal of Management Reviews*, 10(4), 301-325, December 2008.

Ashley, R., Granger, C. W. J., and R. Schmalensee (1980), Advertising and Aggregate Consumption: An Analysis of Causality, *Econometrica*, 48, 1149-68.

Assael, Henry. (1998). *Consumer Behavior and Marketing Action*, 6th ed., Cincinnati: South-Western.

Assmus, G., John U. F., and Donald R. L. (1984) How Advertising Affects Sales: Meta-Analysis of Econometric Results, *Journal of Marketing Research*, 21 (February), 65-74.

Baghestani, H, (1991) Cointegration Analysis of the Advertising-Sales Relationship, *Industrial Economics*, 34, 671-681.

Bagwell, K., 2005, *The Economic Analysis of Advertising*, in M. Armstrong and R. Porter (eds.), Handbook of Industrial Organization, Vol. 3, Elsevier/North-Holland.

Bain, J. S. (1956), *Barriers to New Competition: Their Character and Consequences in Manufacturing Industries*, Cambridge, MA: Harvard University Press.

Baltagi, B. H. and Levin, D. (1992). Cigarette taxation: Raising revenues and reducing consumption. *Structural Change and Economic Dynamics*, 3(2), 321–335.

Baltagi, Badi H., and Dan Levin (1986), Estimating Demand for Cigarettes Using Panel Data: The Effects of Bootlegging, Taxation and Advertising Reconsidered, *Review of Economics and Statistics*, 68 (1), 148–155.

Bass, Frank M and Clarke, Darral G. (1972), Testing Distributed Lag Models of Advertising Effects, *Journal of Marketing Research*, 9 (August), 298-308.

Bass, Frank M. (1969). A Simultaneous Equation Regression Study of Advertising and Sales of Cigarettes, *Journal of Marketing Research*, 6(3), 291-300.

Bass, Frank M. and Robert P. Leone (1983), "Temporal Aggregation, The Data Interval Bias and Empirical Estimation of Bimonthly Relations from Annual Data," Management Science, 29 (January), 1-11.

Batra, R., Meyers, J., and Aaker, D. (1995), *Advertising Management*, 5th ed, Upper Saddle River, NJ: Prentice Hall.

Baye, M.R., Jansen, D.W. and Lee, J-W. (1992) Advertising effects in complete demand systems, *Applied Economics*, 24, 1087-1096.

Bendixen, Mike T. (1993), "Advertising Effects and Effectiveness," *Journal of Marketing*, 27, 19–33.

Bhargava, Mukesh, Naveen Donthu, and Rosanne Caron (1994), Improving the Effectiveness of Outdoor Advertising, *Journal of Advertising Research,* 34, 46–55.

Binkley, J. M. and Eales, J.(2001). Convenience, Accessibility, and the Demand for Fast Food, *Journal of Agricultural and Resource Economics* 26(2001): 58-74.

Bishop, J. A. and Yoo, J. H. (1985). Health scare, excise taxes and advertising ban in the cigarette demand and supply. *Southern Journal of Economics*, 52, 402–411.

Blanchard, O. and Summers, L. (1988). Beyond the Natural Rate Hypothesis, *American Economic Review*, 78,182-187.

Blasubramanian, S. K. and Kumar, V. (1990), Analyzing Variations in Advertising and Promotional Expenditures: Key Correlates in Consumer, Industrial, and Service Markets, *Journal of Marketing*, 54 (April), 57-68.

Blumenthal, H.J. and Goodenough, O. R. (1998). *This Business of Television* (2nd ed.), New York, NY: Billboard Books, of Watson-Guptill Publications.

Boddewyn, J.J. (1989). There is no convincing evidence for a relationship between cigarette advertising and consumption, *British Journal of Addiction*, 84, 1255-1261.

Borden, Neil H.(1952). Economic Effects of Advertising. Homewood, Ill.: Richard D. Irwin.

Borden, Neil, H. (1942a) *The Economic Effects of Advertising*. Chicago, IL: Richard Irwin, Inc.

Borden, Neil, H. (1942b). Findings of the Harvard Study on the Economic Effects of Advertising, *Journal of Marketing*, 6(4), Part 2 (Apr., 1942), 89-99.

Bourgeois, J.C. and Barnes, J. G. (1979) Does advertising increase alcohol consumption? *Journal of Advertising Research*, 19 (August), 19–29.

Bowman, S.A., Gortmaker, S. L., Ebbeling, C. B., Pereira, M.A. and Ludwig, D.S. (2004). Effects of Fast Food Intake and Diet Quality among Children in a National Household Survey, *Pediatrics*, 113 (1), 112–118.

Boyd, R. and Seldon, B. J. (1990) The Fleeting Effect of Advertising: Empirical Evidence from a Case Study, *Economics Letters*, 34, 375-9.

Bradford, G.A. (1960). What General Electric Is Doing to Evaluate the Effect on Sales of Industrial and Consumer Advertising. *In the Report of the Second Meeting of Operations Research Discussion Group.* New York: Advertising Research Foundation, 1960.

Braithwaite, D. (1928), The Economic Effects of Advertisement, *Economic Journal*, 38, 16-37.

Broadbent, Simon (1984), "Modeling with Adstock," Journal of the Market Research SocieQ, 26 (October), 295-3 12.

Brown, George H. (1961). Measuring the Sales Effectiveness of Alternative Media. In *Proceedings: Seventh Annual Conference*. New York: Advertising Research Foundation, 1961, 43-47.

Brown, Mark G. and Lee, Jonq-Ying. (1997) Incorporating generic and brand advertising effects in the Rotterdam demand system, *International Journal of Advertising*, 16, 211-220.

Brown, R. S. (1978) Estimating Advantages to Large-Scale Advertising, *The Review of Economics and Statistics*, 60, 428-37.

Byrne, P., O. Capps, Jr., and A. Saha.(1996). Analysis of Food-Away-from-Home Expenditure Patterns for U.S. Households, 1982-89, *American Journal of Agricultural Economics* 78(1996): 614-627.

Caines, P. E.; Sethi, S. P.; and Brotherton,T. W. (1977): Impulse Response Identification and Causality Detection for the Lydia Pinkham Data. *Annals of Economic and Social Measurement*, 6, 147-63.

Chamberlin, E. (1933), *The Theory of Monopolistic Competition*, Cambridge, MA: Harvard University Press.

Chandler, A. D. (1990), *Scale and Scope: The Dynamics of Industrial Capitalism*, Cambridge, Mass: Harvard University Press

Chandon, Pierre and Wansink, Brian. (2007). The Biasing Health Halos of Fast-Food Restaurant Health Claims: Lower Calorie Estimates and Higher Side-Dish Consumption Intentions. *Journal of Consumer Research*, 34,301-14.

Chang, H. S. and Kinnucan, H. W. (1991) Advertising, information and product quality: the case of butter, *American Journal of Agricultural Economics*, 73, 1195-1203.

Chapman, Simon (1989).The limitations of econometric analysis in cigarette advertising studies, *British Journal of Addiction* **84** (11) (1989), pp. 1267–1274.

Chetwynd, J., Coope, P., Brodie, R.J., Wells, E. (1988). Impact of cigarette advertising on aggregate demand for cigarettes in New Zealand. *British Journal of Addiction*, 83, 409–414.

Chester, J. and Montgomery, K. (2009). Interactive food and beverage marketing: targeting children and youth in the digital age. Berkeley (CA): Berkeley Media Studios Group. http://digitalads.org/documents/digiMarketingFull.pdf.Accessed August 5, 2009.

Chou, Shin-Yi, Rashad, Inas and Grossman, Michael (2005) "Fast-Food Restaurant Advertising on Television and its Influence on Childhood Obesity". NBER Working Paper No. W11879. Available at SSRN: http://ssrn.com/abstract=875730

Chow, Gregory. C. (1960), Test of Equality Between Subsets of Coefficients in Two Linear Regressions, *Econometrica*, 28 (July), 591-605.

Clarke, Darral G. (1976), Econometric Measurement of the Duration of Advertising Effect on Sales, *Journal of Marketing Research*, 13 (November), 345-57.

Comanor, W. S. and T. A. Wilson (1967), Advertising, Market Structure and Performance, *The Review of Economics and Statistics*, 49, 423-40.

Comanor, W. S. and T. A. Wilson (1974), Advertising and Market Power, Cambridge, MA: Harvard University Press.

Confer, M. E. (1992), The Media Multiplier: Nine Studies Conducted in Seven Countries, *Journal of Advertising Research*, 32(1), RC4-RC10.

Confer, M. E. and McGlathery, D. (1991), The Research Study: The Advertising Impact of Magazines in Conjuction with Television, *Journal of Advertising Research*, 31(1), RC2-RC5.

Connor, S, M. (2006). Food-related advertising on preschool television: building brand recognition in young viewers. Pediatrics, 118(4):1478-85. Accessed August 5, 2009.

Cowling, K., Cable, J., Kelly, M. and McGuinness, T. (1975), *Advertising and Economic Behavior*, London: The Macmillan Press, Ltd.

Cowling, Keith and Cubbin, John (1971), Price, Quality and Advertising Competition: An Econometric Investigation of the United Kingdom Car Market, *Econometrica*, 38 (November), 378-94.

Cox, T. L. (1979). Rotterdam Model Incorporating Advertising Effects: The Case of Canadian Fats and Oils, in *Commodity Advertising and Promotion*, H.W. Kinnucan, S.R. Thompson, and H.S. Chang, eds., 139-64. Ames IA: Iowa State Amer. J. Agr.

Cubbin, J. and Domberger, S. (1988) Advertising and Post-Entry Oligopoly Behavior, *Journal of Industrial Economics*, 37, 123-40.

Datamonitor (2007).Fast Food in the United States, Industry Report. Retrieved August, 25, 2008, from Business Monitor International (BMI) database.

Datamonitor (2008).Fast Food in the United States, Industry Report. Retrieved April 6, 2009, from Business Monitor International (BMI) database.

Deighton, John, Henderson, Caroline M., and Neslin, Scott A. (1994). The Effects of Advertising on Brand Switching and Repeat Purchasing, *Journal of Marketing Research*, 31(1), 28-43.

Dekimpe, M. G. and Hanssens, D. M. (1995a). The Persistence of Marketing Effects on Sales, *Marketing Science*, 14 (1): 1-21.

Dekimpe, M. G. and Hanssens, D. M. (1995b) Empirical Generalizations about Market Evolution and Stationarity, *Marketing Science*, 14(3), G109-121.

Dekimpe, M. G. and Hanssens, D. M. (1999) Sustained Spending and Persistent Response: A New Look at Long-term Marketing Profitability, *Journal of Marketing Research*, 36 (November): 1-31.

Dekimpe, M. G. and Hanssens, D. M. (2000) Time-Series Models in Marketing: Past, Present and Future, *International Journal of Research in Marketing*, 17, 183-193.

Dhalla, Norman K. (1978), Assessing the Long-Term Value of Advertising, *Harvard Business Review*, 56 (January/February), 87-95.

Dickey, D. and Fuller, W. (1981). Likelihood Ratio Statistics for Autoregressive Time Series with A Unit Root, *Econometrica*, 49(4): 1057-1072.

Dixit, A. (1989). Hysteresis, Import Penetration, and Exchange Rate Pass Through, *Quarterly Journal of Economics*, 104(2): 205-228.

Duffy, Martyn. (1991). Advertising and the consumption of tobacco and alcoholic drink: a system-wide analysis. *Scottish Journal of Political Economy*, 38 (4), 369–385.

Duffy, Martyn. (1995) Advertising in demand systems for alcoholic drinks and tobacco: a comparative study, *Journal of Policy Modeling*, 17(6), 557-577.

Duffy, Martyn. (1996) An econometric study of advertising and cigarette demand in the United Kingdom, *International Journal of Advertising*, 15(3), 262-284.

Duffy, Martyn. (1999), The influence of advertising on the pattern of food consumption in the UK", *International Journal of Advertising*, 18(2).

Elliott, C. (2001). A cointegration analysis of advertising and sales data. *Review of Industrial Organization*, 18, 417–426.

Emerson, Robert L. (1990). *The New Economics of Fast Food*, John Wiley and Sons Inc.

Engle, Robert F. (1982), Autoregressive Conditional Heteroscedasticity With Estimates of the Variance of U.K. Inflation, *Econometrica*, 50 (July), 987-1007.

Esteve, Vicente and Requena, Francisco (2006). A Cointegration Analysis of Car Advertising and Sales Data in the Presence of Structural Change. *International Journal of the Economics of Business*, 13 (1), 111-128.

Färe, Rolf, Grosskopf, Shawna, Seldon, Barry J. and Tremblay, Victor J. (2004), Advertising Efficiency and the Choice of Media Mix: A Case of Beer, *International Journal of Industrial Organization*, 22, 503–523.

Farley, John U., and Donald R. Lehmann (1986), *Meta-analysis in Marketing: Generalization of Response Models*, Lexington, MA: Lexington Books.

Fisher, Joseph C. and Cook, Peter A. (1995). *Advertising, Alcohol Consumption, and Mortality: An Empirical Investigation*, Greenwood Press.

Food CPI, Prices, and Expenditures: Expenditure Tables. Economic Research Service. Retrieved online on September 30 2008 at: www.ers.usda.gov/briefing/CPIFoodAndExpenditures.

Franke, George R. (1994), U.S. Cigarette Demand, 1961–1990: Econometric Issues, Evidence, and Implications, *Journal of Business Research,* 30 (1), 33–41.

Franke, George, R. and Wilcox, Gary, B. (1987) Alcoholic beverage advertising and consumption in the United States 1964–1984. *Journal of Advertising,* 16 (August), 22–30.

Franses, Philip H. (1991). Primary Demand for Beer in the Netherlands: An Application of ARMAX Model, *Journal of Marketing Research*, 28(2), 240-245.

Fujii, E. T., (1980). The demand for cigarettes: Further empirical evidence and its implications for public policy. *Applied Economics*, 12, 479–489.

Gallet, C.A. (1999). The effects of the 1971 advertising ban on behavior in the cigarette industry. *Managerial and Decision Economics*, 20, 299–303.

Gallo, Anthony, E. (1999). Food advertising in the United States. In Frazao, E. (ed.)American's Eating Habits: Changes and Consequences. Washington, D.C.: USDA/Economic Research Service, Food and Rural Economics Division. Agriculture. Information Bulletin No. 750. Available: http://www.ers.usda.gov/publications/aib750/

Geroski, P. A., and Mazzucato, M. (2001). *Advertising and the evolution of market structure in the US car industry*. London Business School, Mimeo.

Geroski, P. A., and Murfin, A. (1991). Entry and industry evolution: The UK car industry. *Applied Economics*, *23*, 799–810.

Goddard, E.W. and Cozzarin, B. (1992) A preliminary look at advertising beef, pork, chicken, turkey, eggs, milk, butter, cheese and margarine in Canada, in Kinnucan, H.W., Thompson, S.R. and Chang, H-S. (Eds) *Commodity Advertising and Promotion.* Ames: Iowa State University Press.

Godfrey, C. (1986). Price and Advertising Elasticities of Demand for Tobacco. Working paper, ESRC Addiction Research Centre, University of York.

Goel, R. K., and Morey, M. J. (1995). The interdependence of cigarette and liquor demand. *Southern Journal of Economics*, 62, 451–459.

Gordon R, J. (1989). Hysteresis in history: was there ever a Phillips curve? *American Economic Review*, 79(2), 220– 5.

Grabowski, Henry G. and Mueller, Dennis, C. (1978). Industrial Research and Development, Intangible Capital Stocks, and Firm Profit Rates,º *Bell Journal of Economics* , 9, 328- 43.

Grabowski, Henry, G. (1976). The effect of advertising on the inter-industry distribution of demand. *Explorations in Economic Research*, 3,21-75.

Greuger, M., Kamerschen, D., & Klein, P. (2000). The competitive effects of advertising in the US automobile industry 1970–1994. *International Journal of the Economics of Business, 7*(3), 245–261.

Haemer, M, A., Huang, T, T., and Daniels, S, R. (2009). The effect of neurohormonal factors, epigenetic factors, and gut microbiota on risk of obesity. Chronic Diseases, 6(3). http://www.cdc.gov/pcd/issues/2009/jul/09_0011.htm. Accessed August, 4, 2009.

Halford, J, C., Boyland, E,J., Hughes, G, M., Stacey, L., McKean, S., Dovey, T, M. (2008). Beyond-brand effect of television food advertisements on food choice in children: the effects of weight status. Public Health Nutrition, 11(9):897-904.

Hamilton, James L. (1977), The Effect of Cigarette Advertising Bans on Cigarette Consumption, in *Proceedings of the 3rd World Conference on Smoking and Health*, Washington, DC: U.S. Department of Health, Education and Welfare, 829–840.

Hanssens, Dominique M. (1980a), Bivariate Time-Series Analysis of the Relationship Between Sales and Advertising, *Applied Economics*, 12, 329-39.

Hanssens, Dominique M. (1980b), Market Response, Competitive Behavior, and Time Series Analysis, *Journal of Marketing Research*, 17 (November), 470-85.

Harrison, R., Chetwynd, J., and Brodie, R.J. (1989). The influence of advertising on tobacco consumption. *British Journal of Addiction*, 84, 1241–1246.

Harrison, K., and Marske, A. L. (2005). Nutritional content of foods advertised during the television programs children watch most. *American Journal of Public Health, 95,* 1568–1574.

Helmers, R. M. and Johansson, J. K. (1977), An Ex- position of the Box-Jenkins Transfer Function Analysis with an Application to the Advertising-Sales Relationship, *Journal of Marketing Research*, 14 (May), 227-39.

Henry, H. (1996) Does advertising affect total market size?, *Admap*, January, 16-19.

Hoffman, V. H. J. (1987). The effect of advertising on cigarette consumption in the Federal Republic of Germany. *Jahrbucher fur Nationalokonomie und Statistik*, 203, 257–273.

Hogan, David. (1997). Selling 'em by the Sack: White Castle and the Creation of American Food. New York: New York University Press.

Hollander, Sidney . (1949). A Rationale for Advertising Expenditures, *Harvard Business Review*, XXVII (January), 79-87.

Holt, Douglas B. (2002), Do Brands Cause Trouble? A Dialectical Theory of Consumer Culture and Branding, *Journal of Consumer Research*, 29 (June), 70-90.

Hoovers (2009). Fast-Food & Quick-Service Restaurants Industry Overview. Retrieved online at: http://industries.hoovers.com/leisure/restaurants-and-cafes/fast-food-and-quick-service-restaurants

Ippolito, Pauline M. and Janis K. Pappalardo (2002), Advertising Nutrition and Health – Evidence from Food Advertising 1977-1997, *Bureau of Economics Staff Report – Federal Trade Commission*, September.

Ippolito, Pauline M., and Mathios, Alan D. (1995).Information and Advertising: The Case of Fat Consumption in the United States, The American Economic Review, Vol. 85, No. 2, *Papers and Proceedings of the Hundredth and Seventh Annual Meeting of the American Economic Association Washington, DC*, January 6-8, 1995 (May), 91-95.

Jack in the Box. (2009). Company Records: Awards and Recognition. Retrieved online on June 21, 2009 at: *http://www.jackinthebox.com/corporate/corporate-responsibility/awards-and-recognition/creative-and-marketing/*

Jakle, John. (1999). Fast Food: Roadside Restaurants in the Automobile Age. Johns Hopkins University Press.

Jastram, Roy, W. (1955). A Treatment of Distributed Lags in the Theory of Advertising Expenditure, *Journal of Marketing*, XX (July), 36-46.

Jensen, H.H. and Schroeter, J. R. (1992) Television advertising and beef demand: an econometric analysis of "split-cable" household panel scanner data, *Canadian Journal of Agricultural Economics*, 40, 271-294.

Jhally, Sut. (1987). The Codes of Advertising: Fetishism and the Political Economy of Meaning in the Consumer Society, St. Martin Press, Inc., New York, NY.

Johnson, James A., and Oksanen, Ernest H. (1974). Socio- Economic Determinants of the Consumption of Alcoholic Beverages, *Applied Economics* 6 (December), 293-301.

Johnson, L,W. (1986). Advertising expenditure and the aggregate demand for cigarettes in Australia, *International Journal of Advertising*,(1), pp. 45-58.

Jones, John, P. (1990), Advertising: Strong Force or Weak Force? Two Views an Ocean Apart, *International Journal of Advertising*, 9 (July-September), 23346.

Jones, John, P. (1995a), *When Ads Work*, New York: Lexington Books.

Jones, John, P. (1995b) Exposure Effects Under a Microscope, *Admap*,30 (February), 28-3 1.

Kaldor, Nicholas (1950), The Economic Aspects of Advertising, *Review of Economic Studies*, 18 (1), 1-27.

Kao, K., Tremblay, V.J. (1988). Cigarette "health scare", excise tax and advertising ban: Comment. *Southern Economic Journal*, 54, 770–776.

Kara, A., Erdener K., and Orsay K. (1997), Marketing Strategies for Fast-Food Restaurants: A Customer View, *International Journal of Contemporary Hospitality Management*, 7 (4), 16–22.

Kinsey, J.(1990). A graphic look at key economic figures. Diverse demographics drive the food industry, *Choices* 5(1990), 22-23.

Kozlowski, L.T. (1989). Evidence for limits on the acceptability of lowest-tar cigarettes, *American Journal of Public Health*, 79, 2, 152-157.

Kramer, Louise. (1999) $35 mil Sonic ads tout 'America's drive-in'. *Advertising Age*, 70,(18).

Krugman, Herbert E. (1965). The Impact of Television Advertising: Learning Without Involvement, *Public Opinion Quarterly*, 29 (Fall), 349-356.

Krum, Sharon. (2002). It's fat, fat and more fat, *The Guardian*. Retrieved online on April 20, 2009 at: http://www.guardian.co.uk/world/2002/aug/27/usa.health

Kwoka, J. E., Jr. (1993). The sales and competitive effects of styling and advertising practices in the U.S. auto industry. *Review of Economics and Statistics*, *75*, 649–656.

Kwoka, John E. (1992), Market Segmentation by Price-Quality Schedules: Some Evidence from Automobiles, *Journal of Business Research*, 65, 615–628.

Kyle, Peter, (1996). The Impact of Advertising on Markets, Chapter 4 in *Advertising & Markets: A Collection of Seminal Papers*, edited by J.C. Luik and M.J. Waterson, NTC Publications Limited, 1996.

Lambin, J.J. (1970). Optimal allocation of competitive marketing effort: an empirical study. *Journal of Business*, 43, 468–484.

Lambin, Jean-Jacques. (1976). Measuring the Profitability of Advertising: An Empirical Study. *Journal of Industrial Economics* 17 (19): 86-103.

Lancaster, K. J. (1966), A New Approach to Consumer Theory, *Journal of Political Economy*, 74, 132-57.

Laurance, Jeremy.(2003). Fast food is addictive in same way as drugs, say scientists, Independent. Retrieved online on March, 20, 2009 at: http://findarticles.com/p/articles/mi_qn4158/is_20030130/ai_n9681725/

Lavidge, R.J. and Steiner, G. A. (1961) A Model For Predictive Measurements Of Advertising Effectiveness, *Journal of Marketing*, October 1961.

Lears, Jackson. (1994) *Fables of Abundance: A Cultural History of Advertising in America*, New York: Basic Books.

Leefland, P. S. H. and Reuijl, J. C. (1985). Advertising and industry sales: an empirical study of the West German cigarette market. *Journal of Marketing*, 49, 92–98.

Leeflang, Peter and Dick, Wittink (2000). Building models for marketing decisions: Past, present and future, *International Journal of Research in Marketing*, 17: 105-126.

Leone, Robert P. (1983), Modeling Sales-Advertising Relationships: An Integrated Time Series-Econometric Approach, *Journal of Marketing Research*, 20 (August), 291-295.

Leone, Robert P. (1995). Generalizing What is known about Temporal Aggregation and Advertising Carryover, *Marketing Science*, 14 (3), 141-50.

Leone, Robert. P. and Randall, Shultz., L. (1980), A Study of Marketing Generalizations, *Journal of Marketing*, 44 (Winter) 10-18.

Levy, Sidney J. (1963), Symbolism and Life Style, in Dennis W. Rook, ed. *Brands, Consumers, Symbols, & Research*, Beverly Hills, CA: Sage.

Little, John D. C. (1979). Aggregate Advertising Models: The State of the Art, *Operations Research*, 27 (July – August), 629 – 667.

Lodish, L. M., Magid, A., Kalmenson, S., Livelsberger, J., McDonald, C. (1992), *How Advertising Works*. London: The Advertising Association and NTC.

Lodish, L. M., Magid, A., Stuart, K., Livelsberger, J., Lubekin, B., Richardson, B. and Stevens, Mary E. (1995) How TV Advertising Works: A Meta Analysis of 389 Real World Split Cable TV Advertising Experiments, *Journal of Marketing Research*, 32 (May), 125-139.

Luik, J. C. and Waterson, M,J.(1996). *Advertising and Markets*, NTC Publications: Oxfordshire.
MA: Harvard University Press.

MacArthur, Kate. (2000). Sonic Drive-In. *Advertising Age*, 71(27).

MacArthur, Kate. (2002). Thinking outside the pizza box for growth, *Advertising Age*, 73(34).

Maddala, G. S. and In-Moo Kim (1998). *Unit Root, Cointegration, and Structure Change*, Cambridge, UK: Cambridge University Press.

Mahajan, Vijay, Muller, Eitan and Sharma, Subhash. (1984) A Comparison of Awareness Forecasting Models of New Product Introduction, Marketing Science, 3 (Summer), 179-97.

Mankiw, N. and Romer, D. (1991). *New Keynesian economics*. Boston: MIT Press.

Marshall, A. (1890) *Principles of Economics*, London: MacMillan and Co.

Marshall, A. (1919) *Industry and Trade: A Study of Industrial Technique and Business Organization; and of Their Influences on the Conditions of Various Classes and Nations*, London: MacMillan and Co.

McAuliffe, R. (1988). The FTC and the effectiveness of cigarette advertising regulations. *Journal of Public Policy and Marketing*, 7, 49–64.

McCarthy, Michael. (1995). Jack: Undeniably back. *Adweek Western Edition*, 45 (4).

McCracken, Grant D. (1988), *Culture and Consumption*, Bloomingdale & Indianapolis: Indiana University Press.

McCracken, V., and Brandt, J. (1987) Household Consumption of Food Away from Home: Total Expenditure and by Type of Food Facility, A*merican Journal of Agricultural Economics* 69: 274-84.

McDonald, Colin (1971) What Is the Short Term Effect of Advertising?, in *Measuring the Effect of Advertising*, David Corkindale and Sherril Kennedy, eds. Farnborough, England: Saxon House Studies, 463-87.

McDonald's Corporation, (2007). "Corporate FAQ". Retrieved online on October 20, 2007 from: http://www.mcdonalds.ca/en/aboutus/faq.aspx.

McGuinness, T.,(1980). An econometric analysis of total demand for alcoholic beverages in the U.K., 1956-75, *Journal of Industrial Economics*, 29(1), 85-109.

McGuire, Jean B., Sundgren, Alison, and Schneeweis, Thomas, (1988). Corporate Social Responsibility and Firm Financial Performance, *Academy of Management Journal*, 31 (4), 854-872.

Mchrle, M. (1997) Hysteresis in Marketing, *Sloan Management Review*, Summer: 8-9.

Metwally, M. M. (1975) Advertising and Competitive Behavior of Selected Australian Firms, *The Review of Economics and Statistics*, 57, 417-27.

Metwally, M. M. (1976) Profitability of Advertising in Australia: A Case Study, *Journal of Industrial Economics*, 24, 221-31.

Millward Brown (2008). B RA N D Z Top 100 Brand Ranking, Fast Food Category. Retrieved online at: http://www.millwardbrown.com/Sites/optimor/Media/Pdfs/en/BrandZ/BrandZ-2008-Report.pdf

Naples, Michael J. (1979). *Effective Frequency: The Relationship Between Frequency and Advertising Effectiveness*. New York: Association of National Advertisers.

Nation's Restaurant News. (2002).Wendy's to cite Thomas in new 'Dave's way' ads.

National Public Radio (2002). "The Hamburger". Retrieved online on October 21, 2008 from: http://www.npr.org/programs/morning/features/patc/hamburger/.

Nation's Restaurant News (1998). **The Colonel comes back from beyond**, 32 (51), .94.

Nelson, J.P. & Moran, J.R. (1995) Advertising and US alcoholic beverage demand system-wide estimates. *Applied Economics,* 27, pp. 1225–1236.

Nelson, Jon P. (2001). Alcohol Advertising and Advertising Bans: A Survey of Research Methods, Results, and Policy Implications in: *Advances in Applied Microeconomics, Vol 10: Advertising and Differentiated Products*, edited by M.R. Baye and J.P. Nelson, Amsterdam: JAI & Elsevier Science.

Nelson, Jon. P. (2004), Beer Advertising and Marketing Update: Structure, Conduct, and Social Costs, mimeo.

Nelson, Phillip (1970) Information and Consumer Behavior, *Journal of Political Economy*, 78 (March/April), 311- 29.

Nelson, Phillip (1974) Advertising as Information, *Journal of Political Economy*, 82 (July/August), 729-54.

Nelson, Phillip, and John R. Moran. (1995). Advertising and U.S. Alcoholic Beverage Demand: System– Wide Estimates," 27 *Applied Economics,* 1225–1236.

Nelson, Phillip. (1975) The Economic Consequences of Advertising, *Journal of Business*, 48 (April), 213-41.

Nelson, Phillip., Siegfried, J., and Howell, J. (1992). A simultaneous equations model of coffee brand pricing and advertising. *Review of Economics and Statistics*, *74*(1), 54–63.

Nerlove, Marc and Arrow, Kenneth J. (1962) Optimal Advertising Policy under Dynamic Conditions, *Economica,* 39 (May), 129-42.

Nerlove, Marc and Waugh, Frederick. (1961) Advertising without Supply Control: Some Implications of a Study of the Advertising of Oranges. *Journal of Farm Economics*, XLIII (October), 813-37.

Nguyen, D. (1987). Advertising, random sales response, and brand competition: Some theoretical and econometric implications. *Journal of Business*, 60, pp.259:279.

Ouyang, Ming, Zhou, Dongsheng, and Zhou, Nan. (2002). Estimating marketing persistence on sales of consumer durables in China, *Journal of Business Research*, (55) p. 337– 342.

Packard, Vance. (1957). *The hidden persuaders*, Penguin, London.

Paeratakul, Sahasporn, Daphne P. Ferdinand, Catherine M. Champagne, Donna H. Ryan, and George, Bray, A.(2003). Fast-Food Consumption among US Adults and Children: Dietary and Nutrient Intake Profile. *Journal of the American Dietetic Association*, 103 (10), 1332–1339.

Palda, K. S. (1964) *The Measurement of Cumulative Advertising Effects*, Englewood Cliffs, NJ: Prentice Hall.

Palda, Kristian S. (1966), The Hypothesis of a Hierarchy of Effects: A Partial Education, Journal of Marketing Re- search, 3 (February), 13-24.

Parker, P. M. and Gatignon, H. (1996) Order of Entry, Trial Diffusion, and Elasticity Dynamics: An Empirical Case, *Marketing Letters*, 7 (January), 95-109.

Peles, Yoram C. (1970). Amortization of advertising expenditures in the financial statements. *Journal of Accounting Research*, 8, 128–137.

Peles, Yoram C. (1971). Rates of Amortization of Advertising Expenditures. *Journal of Political Economy, (*79): 1032-58.

Peles, Yoram C. (1979). Econometric Measurement of the Duration of Advertising Effect on Sales: A Comment. *Journal of Marketing Research* 16 (May): 284-85.

Phillips, P. and P Perron (1988), Testing for a Unit Root in Time Series Regression, *Biometrica. 2* (3): 1—23.

Pollay R.A., Siddarth, S., and Siegel M. (1996). The last straw? Cigarette advertising and realized market shares among youth and adults, 1979–1993. *Journal of Marketing.*1996; 60:1–16.

Pollay, R.W. (1979). Lydiametrics: Applications of Econometrics to the History of Advertising, *Journal of Advertising History* 1 (January 1979): 3-18.

Pope, D. (1983), *The Making of Modern Advertising*, New York: Basic Books.

Porter, M. E. (1974) Consumer Behavior, Retailer Power and Market Performance in Consumer Goods Industries, *The Review of Economics and Statistics*, 56, 419-36.

Porter, M. E. (1976a) Interbrand Choice, Media Mix and Market Performance, *American Economic Review*, 66, 398-406.

Porter, M. E. (1976b) *Interbrand Choice, Strategy and Bilateral Market Power*, Cambridge, Mass: Harvard University Press.

Porter, R. H. (1986). The impact of government policy on the United States cigarette industry. In: Ippolito, P.M., Scheffman, D.T. (Eds.), *Empirical Approaches to Consumer Protection Economics*, United States Government Printing Office.

Prest, A.R. (1949)."Some Experiments in Demand Analysis," *Review of* Economics and *Statistics,* 31 (February), 33-49.

Prochaska, F. and Schrimper, R.(1973). Opportunity Cost of Time and Other Socioeconomic Effects on Away from Home Food Consumption. *American Journal of Agricultural Economics*, 55 (3):595–603.

Radfar, M. (1985). The effect of advertising on total consumption of cigarettes in the UK: a comment. *European Economic Review*, 29, 225–231.

Rao, A. G. and Peter B. M. (1975) Advertising/Sales Response Functions, *Journal of Advertising Research*, 15, 1-15.

Rao, Vithala R. (1972). Alternative Econometric Models of Sales-Advertising Relationships, Journal of Marketing Research, 9(2), 177-181.

Redman, Barbara. (1980). The Impact of Women's Time Allocation on Expenditure for Meals Away from Home and Prepared Foods. *American Journal of Agriculture Economics*, 62 (2): 234–237.

Robinson, Patrick J., Homer M. Dalbey, Irwin Gross, and Yoram Wind. (1968). *Advertising Measurement and Decision Making*. Boston: Allyn and Bacon.

Saffer, Henry. (2000). Tobacco Advertising and Promotion. In *Tobacco Control in Developing Countries*, ed. P. Jha and F. J. Chaloupka. Oxford, U.K.: Oxford University Press.

SAS (2008) SAS Institute Inc., Cary, North Carolina USA.

Schlosser, E. (2001). Fast Food Nation. New York: Perennial.

Schmalensee, R. (1972). The Economics of Advertising. Amsterdam: North-Holland.

Schneider L, Klein B, and Murphy K. (1981). Government regulation of cigarette health information. *Journal of Law and Economics* 1981; 24, 575-612.

Schumann, David W., Hathcote, Jan M., and West, S. (1991) Corporate Advertising in America: A Review of Published Studies on Use, Measurement, and Effectiveness, *Journal of Advertising*, 20(3), 35-55.

Scott, O. (2006). The Ties That Bind America's Food Chain, *New York Times*, , November, 17, 2006.

Seldon, B. J. and Doroodian, K. (1989) A Simultaneous Model of Cigarette Advertising: Effects of Demand and Industry Response to Public Policy, *The Review of Economics and Statistics*, 71, 673-7.

Selvanathan, E.A. (1991) Cross-country alcohol consumption comparison: an application of the Rotterdam demand system. *Applied Economics*, 23, 1613–1622.

Sheldon, Barry, J. and Doroodian, Khosrow. (1989) A Simultaneous Model of Cigarette Advertising: Effects on Demand and Industry Response to Public Policy, *Review of Economics and Statistics*,71, 673–677.

Shimp, Terence A. (2000). *Advertising Promotion*, 5th ed., New York: Dryden.

Simon, H. (1997): Hysteresis in Marketing -- A New Phenomenon?, *Sloan Management Review*, Spring: 39-49.

Simon, J.L. (1969). The effect of advertising on liquor brand sales. *Journal of Marketing Research*, 6, 301–313.

Singer, J, G. (2009). Marketing ecosystems: framing brand management for business ecosystems. San Diego (CA): CRM Systems Inc. http://www.crm2day.com/library/50216.php.

Slama, M., & Tashchian, R. (1987). Validating the S-O-R Paradigm for Consumer Involvement with a Convenience Good. *Journal of the Academy of Marketing Science*. 15(1), 36 – 45.

Smee, C. (1992). Effects of Tobacco Advertising on Tobacco Sponsorship: A discussion document reviewing the Evidence. *Economics and Operational Research Division*, Department of Health, London.

Srinivasan V. and Helen A. Weir (1988). "A Direct Aggregation Approach to Inferring Microparameters of the Koyck Advertising-Sales Relationship from Macro Data," *Journal of Marketing Research*, 25 (May), 145-56.

Stewart, Hayden, Noel Blisard, Sanjib Bhuyan, and Rodolfo M. Nayga, Jr. (2004). The Demand for Food Away from Home: Table Service or Fast Food? *Agricultural Economic Report*, Number 829. Washington, DC: Economic Research Service, USDA.

Stigler, George (1961) The Economics of Information," *Journal of Political Economy*, 69 (June), 213-25.

Stigler, George, J. (1962) *The Theory of Price* (New York: Macmillan Co., 1962), p. 208.

Story, M., Neumark-Sztainer, D., and French, S. (2002). Individual and environmental influences on adolescent eating behaviors. *Supplement to the Journal of the American Dietetic Association*, 102 (3), S40-S51.

Tavassoli, N. T. (1998) Language in Multimedia: Interaction of Spoken and Written Information, *Journal of Consumer Research*, 25(1), 26-38.

Tavassoli, N. T. and Lee, Y.H. (2003) The Differential Interaction of Auditory and Visual Advertising Elements with Chinese and English, *Journal of Marketing Research*, 40(4), 468-480.

Tegene, A. (1991) Kalman filter and the demand for cigarettes. *Applied Economics*, 23, 1175–1182.

Tellis, Gerard J. (1988) Advertising Exposure, Loyalty and Brand Purchase: A Two-Stage Model of Choice, *Journal of Marketing Research*, 25 (2), 134-44.

Telser, L. G. (1962) Advertising and Cigarettes, *The Journal of Political Economy*, 70 (October), 471-499.

Telser, Lester G. (1964) Advertising and Competition, *Journal of Political Economy*, 72 (December), 537-62.

Thomas, L. A. (1999) Incumbent Firms' Response to Entry: Price, Advertising and New Product Introduction, *International Journal of Industrial Organization*, 17, 527-55.

Thomas, L. G. (1989) Advertising in Consumer Good Industries: Durability, Economies of Scale, and Heterogeneity, *Journal of Law and Economics*, 32, 164-94.

Tremblay, C. H. and Tremblay, V. J. (2005), The U. S. Brewing Industry: Data and Economic Analysis, Cambridge, MA: MIT Press.

Tremblay, C.H., Tremblay, V.J., 1995. The impact of cigarette advertising on consumer surplus, profit, and social welfare, *Contemporary Economic Policy*, 13,113–124.

Tull, Donald, S. (1965). The carry-over effect of advertising. *Journal of Marketing*, 29, 46–53.

Tull, Donald, S. (1956) An Examination of the Hypothesis That Advertising Has a Lagged Effect on Sales (unpublished Ph.D. dissertation, University of Chicago, 1956).

Valdes, B. (1993). Cigarette consumption in Spain: empirical evidence and implications for public policy. Applied Economics 20, 149–156.

Vaughn, R. (1980) How Advertising Works: A Planning Model. *Journal of Advertising Research*, 20 (5), 27 – 33.

Vidale, M. L. and Wolfe, H. B. (1957) An Operations- Research Study of Sales Response to Advertising, *Operations Research*, 5, 370-81.

Walsh, Brendan, M. (1982) The Demand for Alcohol in the UK: A Comment, *The Journal of Industrial Economics*, 30(4), 439-446.

Warner, K. E. (1987). Television and health education: Stay tuned, *American Journal of Public Health*, 77 (2), 140-142.

Weinberg, C.B. and Weiss, D.L. (1982). On the econometric measurement of the duration of advertising effect on sales. *Journal of Marketing Research*, 19, 585–591.

Weiss, D.L. and Windal, P.M. (1980). Testing cumulative advertising effects: a comment on methodology. *Journal of Marketing Research*, 17, 371–378.

Wilcox, Gary B. (1991). "Cigarette Brand Advertising and Consumption in the United States, 1949-1985," *Journal of Advertising Research*, 31, p. 61-67.

Wilcox, Gary B. (2001) "Beer Brand Advertising and Market Share in the United States: 1975 to 1998", *International Journal of Advertising*, 20(2), 149-168.

Wilcox, Gary B., and Gangadharbatla, Harsha, (2006), What's Changed? Does Beer Advertising Affect Consumption in the United States?, *International Journal of Advertising*, , 25(1), 35-50.

Wilcox, Gary B., and Vacker, Barry, (1992). "Cigarette Advertising and Consumption in the United States, 1961- 1990", *International Journal of Advertising*, **11**, 3 (1992): 269–78.

Wilcox, Gary B., Gangadharbatla, Harsha, and Kamal, Sara, (2009). Soft drink advertising and consumption in the United States 1984--2007.*International Journal of Advertising*; 28(2), 351-367.

Winer, Russell S. (1986) A Reference Price Model of Brand Choice for Frequently Purchased Products, *Journal of Consumer Research,* 13 (September), 250-256.

Winner, R. S. (1979) An Analysis of the Time-Varying Effects of Advertising: The Case of Lydia Pinkham, *Journal of Business*, 52 (October), 563-576

Witt, S.F., Pass, C.L. (1981) The effects of health warnings and advertising on the demand for cigarettes. *Scottish Journal of Political Economy,* 28 (1), 86–91.

Yasin, Jo. (1996) The Effects of Advertising on Fast-moving Consumer Goods Market, Chapter 8 in *Advertising & Markets: A Collection of Seminal Papers*, edited by J.C. Luik and M.J. Waterson, NTC Publications Limited, 1996.

Yen, S. (1993) Working Wives and Food away from Home: The Box-Cox Double Hurdle Model, *American Journal of Agricultural Economics* 75, 884-95.

Yiannaka, A., Giannakas, K. and Tran, K.C. (2002) Medium, message, and advertising effectiveness in the Greek processed meats industry. *Applied Economics*, 14, 1757–1763.

Young, T. (1983) The demand for cigarettes: alternative specifications of Fujii's model. *Applied Economics*, 15, 203–211.

Yuclet, U., Kaynak, E. (1984) A study of measuring influence of advertising and forecasting cigarette sales. *Managerial and Decision Economics* 5, 213–218.

Zanias, G. P. (1994) 'The Long-Run, Causality, and Forecasting in the Advertising-Sales Relationship', *Journal of Forecasting*, 13, 601–610.

Zhou, Nan, Zhou, Dongsheng and Ouyang, Ming. (2003). Long-Term Effects of TV Advertising on Sales of Consumer Durables and Non-Durables: The Case of China, *Journal of Advertising, 32, (2),* 45-54.

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